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EOSDIS Core System Project

ECS Project Training Material Volume 6: Production Planning and Processing

July 1999

Raytheon Systems Company
Upper Marlboro, Maryland

ECS Project Training Material
Volume 6: Production Planning and Processing

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Preface

This document is a contract deliverable with an approval code of 3. As such, it does not require formal Government approval. This document is delivered for information only, but is subject to approval as meeting contractual requirements.

Any questions should be addressed to:

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Abstract

This is Volume 6 of a series of lessons containing the training material for Release 5A of the Earth Observing System Data and Information System (EOSDIS) Core System (ECS). This lesson provides a detailed description of the process required for creating, modifying, and implementing production requests and production plans and monitoring the processing of data processing requests.

***Keywords**:* training, instructional design, course objective, production request, production plan, data processing request, production, planning, processing.

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Introduction

Identification

Training Material Volume 6 is part of Contract Data Requirements List (CDRL) Item 129, whose requirements are specified in Data Item Description (DID) 625/OP3 and is a required deliverable under the Earth Observing System Data and Information System (EOSDIS) Core System (ECS), Contract (NAS5-60000).

Scope

Training Material Volume 6 describes the procedures by which the production team prepares production plans and monitors production processing. This lesson is designed to provide the operations staff with sufficient knowledge and information to satisfy all lesson objectives.

Purpose

The purpose of this Student Guide is to provide a detailed course of instruction that forms the basis for understanding production planning and processing. Lesson objectives are developed and will be used to guide the flow of instruction for this lesson. The lesson objectives will serve as the basis for verifying that all lesson topics are contained within this Student Guide and slide presentation material.

Status and Schedule

This lesson module provides detailed information about training for Release 5A. Subsequent revisions will be submitted as needed.

Organization

This document is organized as follows:

Introduction:	The Introduction presents the document identification, scope, purpose, and organization.
Related Documentation:	Related Documentation identifies parent, applicable and information documents associated with this document.
Student Guide:	The Student Guide identifies the core elements of this lesson. All Lesson Objectives and associated topics are included.
Slide Presentation:	Slide Presentation is reserved for all slides used by the instructor during the presentation of this lesson.

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Related Documentation

Parent Document

The parent document is the document from which this ECS Training Material's scope and content are derived.

423-41-01	Goddard Space Flight Center, EOSDIS Core System (ECS) Statement of Work

Applicable Documents

The following documents are referenced within this ECS Training Material, or are directly applicable, or contain policies or other directive matters that are binding upon the content of this document:

420-05-03	Goddard Space Flight Center, Earth Observing System (EOS) Performance Assurance Requirements for the EOSDIS Core System (ECS)
423-41-02	Goddard Space Flight Center, Functional and Performance Requirements Specification for the Earth Observing System Data and Information System (EOSDIS) Core System (ECS)

Information Documents

Information Documents Referenced

The following documents are referenced herein and amplify or clarify the information presented in this document. These documents are not binding on the content of the ECS Training Material.

535-TIP-CPT-001	Goddard Space Flight Center, Mission Operations and Data Systems Directorate (MO&DSD) Technical Information Program Networks Technical Training Facility, Contractor-Provided Training Specification
609-CD-500	Release 5A Operations Tools Manual for the ECS Project
611-CD-500	Release 5A Mission Operation Procedures for the ECS Project

Information Documents Not Referenced

The following documents, although not referenced herein and/or not directly applicable, do amplify or clarify the information presented in this document. These documents are not binding on the content of the ECS Training Material.

220-TP-001	Operations Scenarios - ECS Release B.0 Impacts

305-CD-020	Release B SDPS/CSMS System Design Specification Overview for the ECS Project
305-CD-021	Release B SDPS Client Subsystem Design Specification for the ECS Project
305-CD-022	Release B SDPS Interoperability Subsystem Design Specification for the ECS Project
305-CD-023	Release B SDPS Data Management Subsystem Design Specification for the ECS Project
305-CD-024	Release B SDPS Data Server Subsystem Design Specification for the ECS Project
305-CD-025	Release B SDPS Ingest Subsystem Design Specification [for the ECS Project]
305-CD-026	Release B SDPS Planning Subsystem Design Specification for the ECS Project
305-CD-027	Release B SDPS Data Processing Subsystem Design Specification for the ECS Project
305-CD-028	Release B CSMS Communications Subsystem Design Specification for the ECS Project
305-CD-029	Release B CSMS System Management Subsystem Design Specification for the ECS Project
305-CD-030	Release B GSFC DAAC Design Specification for the ECS Project
305-CD-031	Release B Langley DAAC Design Specification for the ECS Project
305-CD-033	Release B EDC DAAC Design Specification for the ECS Project
305-CD-034	Release B ASF DAAC Design Specification for the ECS Project
305-CD-035	Release B NSIDC DAAC Design Specification for the ECS Project
305-CD-036	Release B JPL PO.DAAC Design Specification for the ECS Project
305-CD-037	Release B ORNL DAAC Design Specification for the ECS Project
305-CD-038	Release B System Monitoring and Coordination Center Design Specification for the ECS Project
305-CD-039	Release B Data Dictionary Subsystem Design Specification for the ECS Project
601-CD-001	Maintenance and Operations Management Plan for the ECS Project
604-CD-001	Operations Concept for the ECS Project: Part 1-- ECS Overview
604-CD-002	Operations Concept for the ECS Project: Part 2B -- ECS Release B

605-CD-002	Release B SDPS/CSMS Operations Scenarios for the ECS Project
607-CD-001	ECS Maintenance and Operations Position Descriptions
500-1002	Goddard Space Flight Center, Network and Mission Operations Support (NMOS) Certification Program, 1/90

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Production Planning and Processing Overview

Lesson Overview

This lesson will provide you with the complete process by which the production team prepares production plans and monitors production processing. The processes described in the lesson apply primarily to Production Planners and Production Monitors. The procedures involved in production planning and processing include such tasks as preparing production requests, preparing production plans and monitoring data processing.

Lesson Objectives

Overall Objective - The overall objective of the Production Planning and Processing lesson is for Maintenance and Operations (M&O) personnel to develop proficiency in the procedures that apply to production planning and production processing operations for the Earth Observing System (EOS) Data and Information System (EOSDIS) Core System (ECS).

Condition - The student will be given oral or written information and requirements for performing production planning and processing activities, access to the planning and production processing systems, a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform production planning and processing activities in accordance with the prescribed procedures without error.

Specific Objective 1 - The student will describe the general functions and processes included in the Planning Subsystem and the Data Processing Subsystem (in the context of ECS operations).

Condition - The student will be given written or oral questions concerning the general functions and processes included in the Planning and Data Processing Subsystems.

Standard - The student will state without error the general functions and processes included in the Planning and Data Processing Subsystems in accordance with the applicable procedure.

Specific Objective 2 - The student will describe the purposes and general functions of production rules in the context of ECS operations.

Condition - The student will be given written or oral questions concerning the purposes and general functions of production rules.

Standard - The student will state without error the purposes and general functions of production rules in accordance with the training lesson materials.

Specific Objective 3 - The student will perform the steps involved in launching the Production Request Editor.

Condition - The student will be given a statement of the requirements for launching the Production Request Editor, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in launching the Production Request Editor in accordance with the applicable procedure.

Specific Objective 4 - The student will perform the steps involved in creating a new production request.

Condition - The student will be given a statement of the requirements for creating a new production request, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in creating a new production request in accordance with the applicable procedure.

Specific Objective 5 - The student will perform the steps involved in modifying a production request.

Condition - The student will be given a statement of the requirements for modifying a production request, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in modifying a production request in accordance with the applicable procedure.

Specific Objective 6 - The student will perform the steps involved in deleting a production request.

Condition - The student will be given a statement of the requirements for deleting a production request, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in deleting a production request in accordance with the applicable procedure.

Specific Objective 7 - The student will perform the steps involved in reviewing data processing requests.

Condition - The student will be given a statement of the requirements for reviewing data processing requests, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing data processing requests in accordance with the applicable procedure.

Specific Objective 8 - The student will perform the steps involved in deleting a data processing request.

Condition - The student will be given a statement of the requirements for deleting a data processing request, access to the planning system (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in deleting a data processing request in accordance with the applicable procedure.

Specific Objective 9 - The student will perform the steps involved in submitting and withdrawing subscriptions using the subscription editor.

Condition - The student will be given a statement of the requirements for submitting and withdrawing subscriptions using the subscription editor, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in submitting and withdrawing subscriptions using the subscription editor in accordance with the applicable procedure.

Specific Objective 10 - The student will perform the steps involved in launching planning workbench-related GUIs.

Condition - The student will be given a statement of the requirements for launching planning workbench-related GUIs, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in launching planning workbench-related GUIs in accordance with the applicable procedure.

Specific Objective 11 - The student will perform the steps involved in defining a production strategy.

Condition - The student will be given a statement of the requirements for defining a production strategy, access to the planning system (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in defining a production strategy in accordance with the applicable procedure.

Specific Objective 12 - The student will perform the steps involved in creating a new production plan.

Condition - The student will be given a statement of the requirements for creating a new production plan, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in creating a new production plan in accordance with the applicable procedure.

Specific Objective 13 - The student will perform the steps involved in reviewing a production plan timeline.

Condition - The student will be given a statement of the requirements for reviewing a production plan timeline, access to the Planning Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing a production plan timeline in accordance with the applicable procedure.

Specific Objective 14 - The student will perform the steps involved in troubleshooting production planning problems.

Condition - The student will be given a statement of the requirements for troubleshooting production planning problems, access to the Planning, Data Processing, Interoperability, Data Server, and Communications Subsystems (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in troubleshooting production planning problems in accordance with the applicable procedure.

Specific Objective 15 - The student will perform the steps involved in launching the AutoSys GUI Control Panel.

Condition - The student will be given a statement of the requirements for launching the AutoSys GUI Control Panel, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in launching the AutoSys GUI Control Panel in accordance with the applicable procedure.

Specific Objective 16 - The student will perform the steps involved in configuring AutoSys runtime options.

Condition - The student will be given a statement of the requirements for configuring AutoSys runtime options, access to the data processing system (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in configuring AutoSys runtime options in accordance with the applicable procedure.

Specific Objective 17 - The student will perform the steps involved in reviewing hardware status (including changing hardware status views) using AutoSys.

Condition - The student will be given a statement of the requirements for reviewing hardware status (including changing hardware status views) using AutoSys, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing hardware status (including changing hardware status views) using AutoSys in accordance with the applicable procedure.

Specific Objective 18 - The student will perform the steps involved in reviewing data processing request (DPR) dependencies.

Condition - The student will be given a statement of the requirements for reviewing DPR dependencies, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing DPR dependencies in accordance with the applicable procedure.

Specific Objective 19 - The student will perform the steps involved in reviewing the DPR production timeline.

Condition - The student will be given a statement of the requirements for reviewing the DPR production timeline, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing the DPR production timeline in accordance with the applicable procedure.

Specific Objective 20 - The student will perform the steps involved in reviewing AutoSys alarms (including selecting alarms to be displayed).

Condition - The student will be given a statement of the requirements for reviewing AutoSys alarms (including selecting alarms to be displayed), access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing AutoSys alarms (including selecting alarms to be displayed) in accordance with the applicable procedure.

Specific Objective 21 - The student will perform the steps involved in specifying job selection criteria and reviewing job activities using AutoSys.

Condition - The student will be given a statement of the requirements for specifying job selection criteria and reviewing job activities using AutoSys, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in specifying job selection criteria and reviewing job activities using AutoSys in accordance with the applicable procedure.

Specific Objective 22 - The student will perform the steps involved in determining the ownership of an AutoSys job.

Condition - The student will be given a statement of the requirements for determining the ownership of an AutoSys job, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in determining the ownership of an AutoSys job in accordance with the applicable procedure.

Specific Objective 23 - The student will perform the steps involved in modifying job status (including sending an event to a job) using AutoSys.

Condition - The student will be given a statement of the requirements for modifying job status (including sending an event to a job) using AutoSys, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in modifying job status (including sending an event to a job) using AutoSys in accordance with the applicable procedure.

Specific Objective 24 - The student will perform the steps involved in reviewing activity logs and job dependency logs.

Condition - The student will be given a statement of the requirements for reviewing activity logs and job dependency logs, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing activity logs and job dependency logs in accordance with the applicable procedure.

Specific Objective 25 - The student will perform the steps involved in defining and running monitors/browsers.

Condition - The student will be given a statement of the requirements for defining and running monitors/browsers, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in defining and running monitors/browsers in accordance with the applicable procedure.

Specific Objective 26 - The student will perform the steps involved in reviewing the database maintenance time.

Condition - The student will be given a statement of the requirements for reviewing the database maintenance time, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in reviewing the database maintenance time in accordance with the applicable procedure.

Specific Objective 27 - The student will perform the steps involved in modifying the maximum number of jobs in AutoSys.

Condition - The student will be given a statement of the requirements for modifying the maximum number of jobs in AutoSys, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in modifying the maximum number of jobs in AutoSys in accordance with the applicable procedure.

Specific Objective 28 - The student will perform the steps involved in troubleshooting processing problems.

Condition - The student will be given a statement of the requirements for troubleshooting processing problems, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in troubleshooting processing problems in accordance with the applicable procedure.

Specific Objective 29 - The student will perform the steps involved in launching the Quality Assurance (QA) Monitor GUI.

Condition - The student will be given a statement of the requirements for QA Monitor GUI, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in QA Monitor GUI in accordance with the applicable procedure.

Specific Objective 30 - The student will perform the steps involved in updating quality assurance (QA) metadata of a science product granule.

Condition - The student will be given a statement of the requirements for updating QA metadata, access to the Data Processing Subsystem (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in updating QA metadata in accordance with the applicable procedure.

Specific Objective 31 - The student will perform the steps involved in regenerating granules in response to a loss of files from the archive.

Condition - The student will be given a statement of the requirements for regenerating granules in response to a loss of files from the archive, access to the Planning and Data Processing Subsystems (through a workstation or X terminal), a copy of 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*, and a copy of 611-CD-500-001, *Mission Operation Procedures for the ECS Project*.

Standard - The student will perform without error the steps involved in regenerating granules in response to a loss of files from the archive in accordance with the applicable procedure.

Importance

This lesson applies to students who will be members of the ECS production team (especially Production Planners and Production Monitors). The lesson will provide them with the knowledge and skills needed when performing their assigned tasks. Those tasks include (among other things) preparing production requests, preparing production plans and monitoring DPR processing. The lesson describes why and how the activities are performed. Consequently, the students will become aware of what tasks they will be performing on the job and how to accomplish those tasks.

Production Planning and Processing

ECS Context

ECS production planning and processing processes are accomplished at the Distributed Active Archive Centers (DAACs). The people involved in production planning and processing activities are Production Planners and Production Monitors.

- The Production Planner performs planning functions; especially, notifying the Planning Subsystem (PLS) of the science processing jobs that are to be processed and when they are to be processed.
- The Production Monitor keeps track of operations in the Data Processing Subsystem, especially the execution of science data processing jobs (creation of data products).

The ECS Context Diagram (Figure 1) shows the relationships among the Planning Subsystem, Data Processing Subsystem, Data Server Subsystem, and the other subsystems within the Science Data Processing component of ECS. It is apparent that the interfaces the Planning and Data Processing Subsystems have with each other and that each has with the Data Server Subsystem (which manages access to the data archive) are critically important. Of course the context diagram shows a generalized (high-level) view of ECS. The Planning Subsystem and Data Processing Subsystem Architecture diagrams (Figures 2 and 3 respectively) focus on the individual subsystems and their relationships with other subsystems.

The Planning Subsystem (Figure 2) provides a mechanism for accomplishing the following general functions:

- Defining DAAC production resources.
- Scheduling production resources for non-production-related activities.
- Defining data processing jobs to be performed at the DAAC.
- Generating efficient plans for scheduling defined data processing jobs.
- Coordinating production with the Data Server Subsystem and Data Processing Subsystem to achieve a highly automated production system.

The Data Processing Subsystem PRONG computer software configuration item (CSCI) shown in Figure 3 is involved in the following general functions:

- Managing the allocation of data processing jobs to the site's data processing resources.
- Managing, queuing, and executing data processing jobs to produce data products.
- Supporting preliminary processing of ancillary data sets.

- Providing a Quality Assurance (QA) environment for checking the quality of data products.

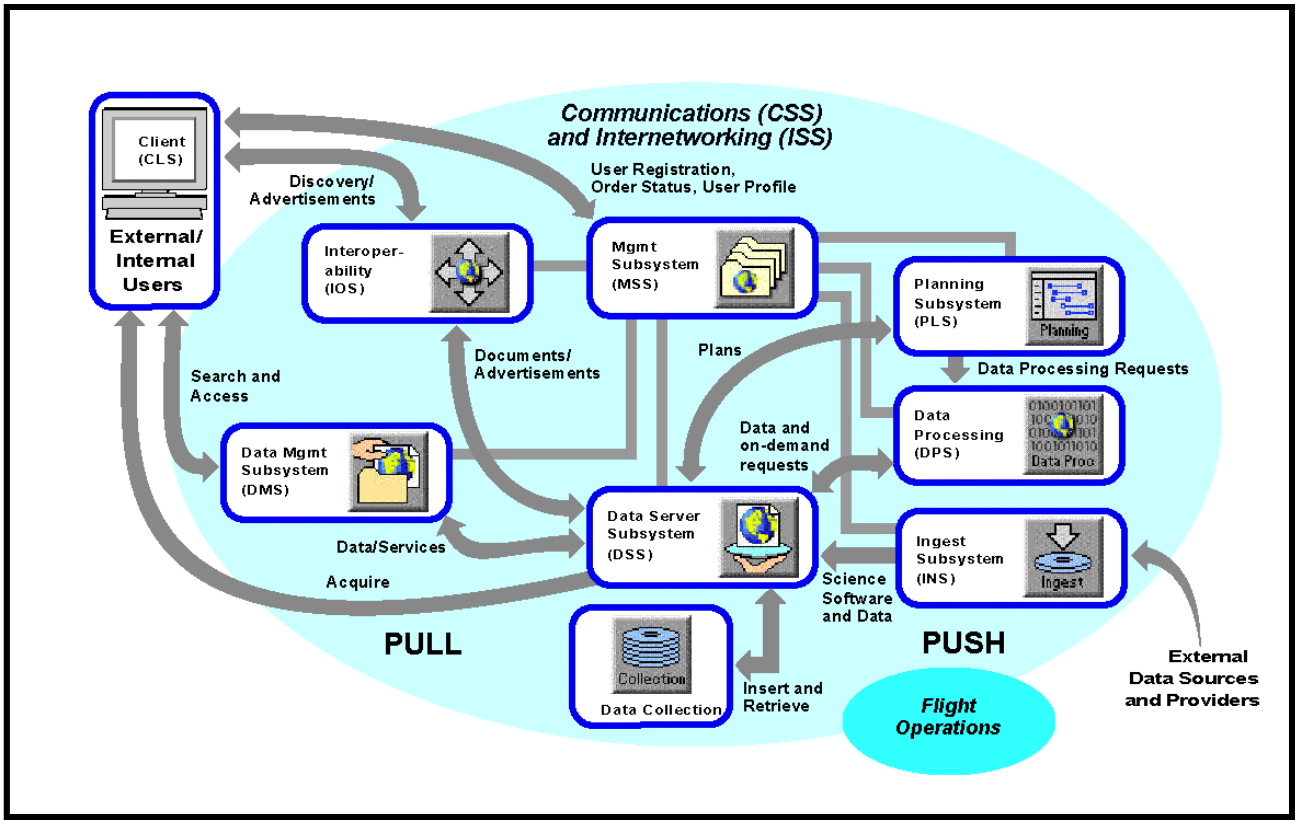

Figure 1. ECS Context Diagram

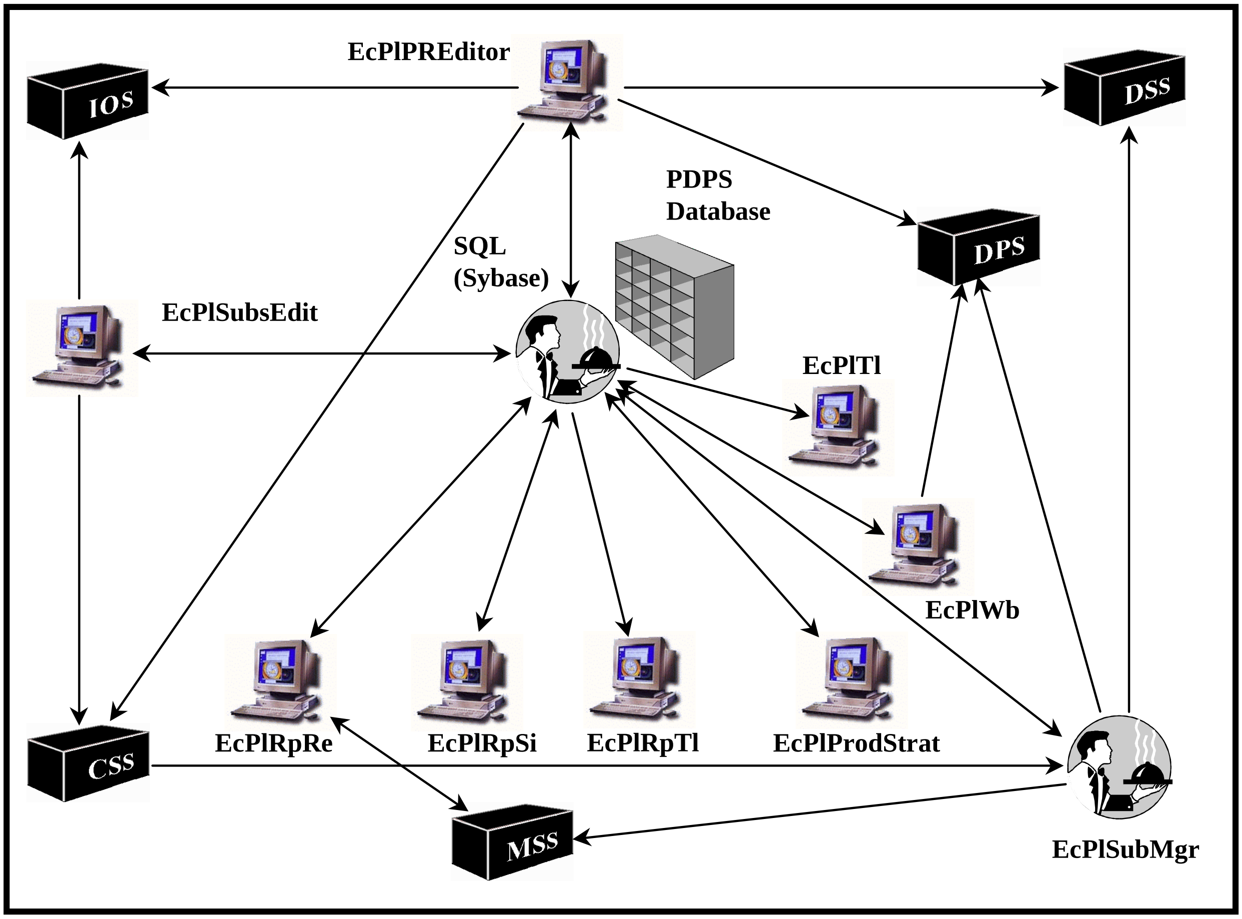

Figure 2. Planning Subsystem Architecture

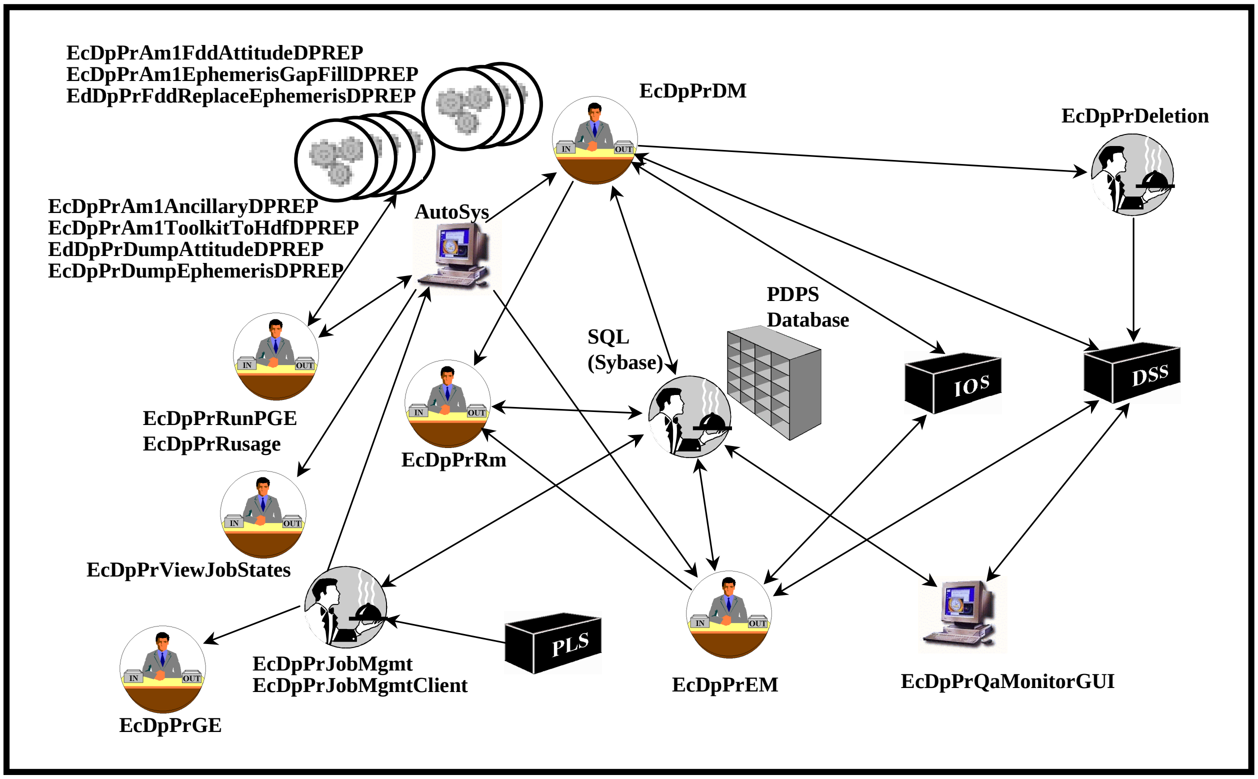

Figure 3. Data Processing Subsystem (PRONG CSCI) Architecture

Planning Subsystem

The Planning Subsystem (Figure 2) is the ECS Science Data Processing subsystem that the Production Planner uses when developing production plans. The Production Planner has access to the Planning Subsystem primarily through the Production Request Editor and the Planning Workbench. The Production Request Editor (PRE) is used for creating or modifying production requests (PRs); the Planning Workbench is used for scheduling PRs.

The Planning Subsystem is composed of just one computer software configuration item (CSCI); i.e., PLANG. The subsystem has the following major components as shown in Figure 2:

- Resource Planning Workbench.
  - — Resource Editor GUI (EcPlRpRe) - Graphical user interface (GUI) for defining/editing the resources at the site.
  - — Resource Scheduler GUI (EcPlRpSi) - GUI for creating/approving/committing resource reservations for non-production-related events and preparing a site resource schedule.
  - — Resource Reservation Planning Master Timeline GUI (EcPlRpTl) - Graphical interface for displaying the resource schedule.

- Production Request Editor (EcPlPREditor).
  - GUI for submitting production requests that describe the data products to be produced; uses product generation executive (PGE) descriptions to generate the data processing requests (DPRs) necessary to fulfill the production requests.
- Production Planning Workbench.
  - Planning Workbench GUI (EcPlWb) - GUI for preparing and activating a site production schedule.
  - Production Strategies GUI (EcPlProdStrat) - GUI for defining production strategies (assign priorities for DPRs based on such characteristics as the type of production request, who is requesting processing, and the type of PGE to be run).
  - Planning Master Timeline GUI (EcPlTl) - Graphical interface for displaying production schedules, including resource reservations.
- Subscription Manager (EcPlSubMgr).
  - Server that manages receipt of subscription notifications (e.g., availability of input data needed for DPRs).
- Subscription Editor (EcPlSubsEdit).
  - Character-based user interface that may be used to either submit or withdraw subscriptions for notification of system events (e.g., insertion of data into the archive).
  - Subscriptions may be submitted on behalf of a general user or on behalf of the Planning Subsystem.
- Sybase Structured Query Language (SQL) Server.
  - Commercial off-the-shelf (COTS) software application that handles insertion of data for planning and processing activities into the Planning and Data Processing Subsystems’ (PDPS) shared database.

In addition to the preceding major components the Planning Subsystem includes the following components associated with both the resource planning applications and the production planning workbench:

- Message Handler (EcPlMsh).
  - GUI that displays various types of messages including warning messages and information messages.
- System Name Server (EcPlSns).
  - Handles interprocess communication.

- Resource Model (EcPlRpRm, EcPlRm).
    - Underlying resource data coordinators for the planning software.

The Message Handler, System Name Server, and Resource Model are associated with both the resource planning workbench and the production planning workbench applications:

Data Processing Subsystem

The Data Processing Subsystem is the ECS Science Data Processing subsystem that the Production Monitor uses when monitoring data processing. The Production Monitor has access to the Data Processing Subsystem primarily through AutoSys/AutoXpert and the Quality Assurance Monitor (QA Monitor). AutoSys is used for monitoring the processing of DPRs. The QA Monitor is used primarily for updating QA metadata flags.

The Data Processing Subsystem is composed of the following three computer software configuration items (CSCIs):

- PRONG.
    - Provides the services required to manage and monitor the Science Data Processing environment, which executes Science Software items (PGEs) and produces data products.
- Algorithm Integration & Test Tools (AITTL).
    - Set of tools used for test and integration of new science software, new versions of science software, and user methods into the Science Data Processing operational environment.
- Science Data Processing (SDP) Toolkit.
    - Provides a set of software libraries, which are used to integrate Science Software into the ECS environment.

The PRONG CSCI is the focus of this section. PRONG (shown in Figure 3) has the following major components:

- Job Management (EcDpPrJobMgmt).
    - Uses the AutoSys COTS product to create and initiate execution of PRONG administrative jobs for managing science processor hardware assets and for PGE execution.
    - Responsible for efficient AutoSys management so the maximum number of jobs possible can be continuously run using the product. (Controls the flow of jobs through AutoSys by only allowing jobs ready to run into the product and by removing jobs as they complete.)
    - Creates and starts execution of Ground Event jobs in AutoSys.

- Ground Event process (EcDpPrGE).
  - Initiated by the Job Management server when the server gets a ground event request.
  - The ground event process starts at a specified time and runs a specified duration.
  - During the time the ground event process runs, it sets a computer resource [central processing unit (CPU), random-access memory (RAM), etc.] off-line and the computer resource is not available for running PGEs.
- Job Management Client (EcDpPrJobMgmtClient).
  - Used by programs that need access to the Job Management Server services to modify jobs in AutoSys (i.e., change the priority of jobs in AutoSys).
- AutoSys/AutoXpert.
  - COTS job scheduling software application used to accomplish the execution of jobs that support PGE execution in an automated fashion.
  - Provides the ability to create job boxes (a series of related jobs).
  - Manages job dependencies (the input of some processing jobs is the output of other jobs).
  - Provides graphical depictions of scheduled jobs, completed jobs, and jobs being processed.
  - Includes GUIs that allow human intervention in the AutoSys job stream.
  - Provides various mechanisms for monitoring and altering the job stream.
- Execution Management (EcDpPrEM).
  - Initiates PGE execution (via AutoSys).
  - Supports the preparation activities prior to the execution of each PGE and activities subsequent to the execution of each PGE.
- Resource Management (DpPrRm).
  - Library that supports efficient use of computer resources required for science production processing.
  - Used for the allocation of resources (i.e., disk space, random-access memory (RAM), and Central Processing Unit (CPU) resources) for executing PGEs.
  - After a PGE completes its execution, the CPU and memory that were allocated are made available for the execution of other PGEs.
  - Allows removal of files from the production disk as space is needed.

- Data Management (EcDpPrDM).
  - Manages the flow of science data to and from science processing resources.
  - Provides additional functions to manage the retention of data on science processing resources to support many PGE executions.
- PGE Execution Manager (EcDpPrRunPGE).
  - Controls and monitors the execution of a PGE, including the creation of a Process Control File (PCF) and the growth of the output products.
- Resource Usage (EcDpPrRusage).
  - Measures the actual resources used by a PGE.
  - Reports unexpected resource usage to AutoSys.
- View Job States (EcDpPrViewJobStates).
  - Allows the Production Monitor to view jobs in the queue to determine the jobs that have completed, the jobs that are executing, and the jobs awaiting execution.
- Data Preprocessing (DPREP).
  - Set of PGEs that use a statistical approach to convert level zero (L0) attitude and ephemeris ancillary data into SDP Toolkit native binary format without altering or modifying the scientific content of the data sets.
    - EcDpPrAm1EdosEphAttDPREP_PGE [Step 1].
    - EcDpPrAm1FddAttitudeDPREP_PGE [Step 2].
    - EcDpPrAm1FddEphemerisDPREP_PGE [Step 3].
- Deletion Server (EcDpPrDeletion).
  - Notifies Science Data Server to remove interim granules via the data management process once they are no longer needed.
  - Interim product is removed after the last PGE in the chain has used the interim product and a pre set time has expired after its last use.
- Sybase SQL Server.
  - COTS product that acts as an SQL server for the PDPS database.
- Quality Assurance Monitor (EcDpPrQaMonitorGUI).
  - Simple interface that allows DAAC operators to transfer science data from the archives, browse data images, and examine and update science metadata.

Production Requests

Science Software and Production Requests

Science software is one of the keys to production planning and processing:

- Performs the actual data processing to create desired products.
- Is developed at Science Computing Facilities (SCFs) external to ECS.
- Is embodied in Product Generation Executives (PGEs) when the software is integrated into the ECS production processing environment.
  - PGEs are science software code (e.g., executable programs or shell scripts) that contain the instructions for processing data to create the desired products.

The production request (PR) is another key to production planning and processing. The Production Planner defines ECS science data processing in terms of PRs.

- A PR is an order for data to be produced by the Data Processing Subsystem.
- A single PR may specify several jobs (using the same PGE) that are to be run over a period of time or a single job producing a single set of data.
- PRs may apply to the processing of new data (standard PRs or standing orders) or the reprocessing of existing data (reprocessing PRs).
- Each PR identifies a specific PGE for generating a particular type of product.
  - Some PGEs are dependent on others; i.e., some PGEs require input data that are the output of other PGEs.
  - The planning software will recognize and reject a PR when the PR specifies a PGE that requires data from another PGE that has not yet been specified in a PR.

The Planning Subsystem performs the following functions:

- Uses each PR to generate either one or a series of Data Processing Requests (DPRs).
  - Each DPR corresponds to one execution of a single PGE.
  - Each DPR contains the information that is needed by the SDP processing function, including PGE-related information.
- Checks the availability of the data required for the DPR, either from the Science Data Server (if the data have been previously ingested) or from internal predictions (if the data are expected to arrive in the future).

- Determines what data will be included in the DPR output so the system can make predictions concerning the availability of data for subsequent PGEs.

Figure 4 shows the relationships among the PGEs, PRs, and DPRs as they are accessed through the Production Request Editor GUI.

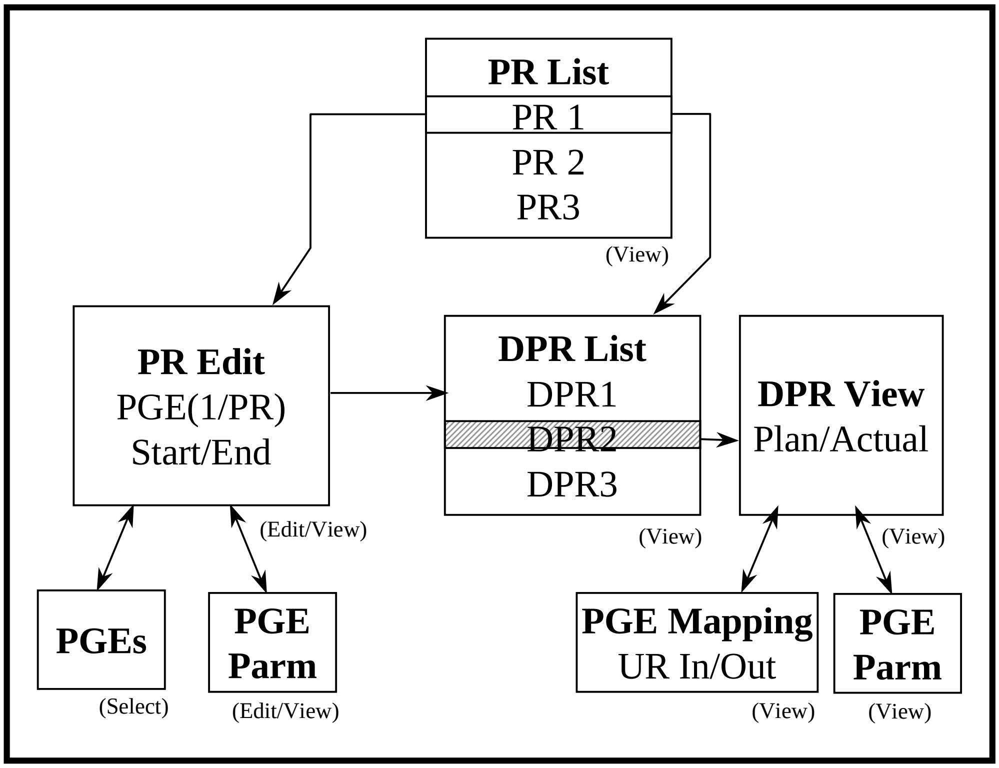

Figure 4. Production Request Editor Flow

Types of Processing

ECS either accommodates or will accommodate the following four general types of data processing:

- Routine Processing
- Reprocessing
- Ad-Hoc Reprocessing
- On-Demand Processing

Routine processing is pre-defined software production processing that is periodic and keyed to data arrival. For example, every day a Production Planner includes in the daily schedule a DPR for generating a particular Level 1A product from the most recent Level 0 data from the applicable satellite instrument.

Reprocessing typically involves using a new, improved PGE to process data that had previously been processed with an older version of the PGE. In such cases reprocessing would be a large-scale operation, especially if several years worth of data were to be reprocessed. Consequently, the Production Planner is likely to schedule reprocessing in manageable quantities so the processing resources can accommodate routine and on-demand processing in addition to the reprocessing.

In addition, ad-hoc reprocessing could be necessary at any time. For example, if a product fails a quality assurance (QA) check, the same PGE could be run again on the same data set in the hope of creating an acceptable product. Similarly, if processing of a PGE fails for some reason, it might be possible to rerun the PGE and hopefully achieve a successful outcome.

On-demand processing is ad-hoc processing initiated by either the Planning Subsystem or an end-user (as opposed to the Production Planner). For example, a researcher using data from the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) instrument on the Terra satellite may need a particular Level 2 product that has not yet been generated. The ASTER researcher would submit an on-demand request to have the product generated from a Level 1B product stored in the archive.

Automated on-demand processing is a future feature (scheduled for the Release 5B time frame). It is anticipated that on-demand processing requests (ODPRs) will be entered from a Client Subsystem tool, passed through the Data Management Subsystem and the Data Server Subsystem to the Planning Subsystem. Currently there is a work-around to the automated process which requires the requester to contact DAAC personnel to make the request. So far ASTER researchers are the only identified external users of automated on-demand processing.

Another future feature is automated cross-DAAC planning. It is a process that will be undertaken when products produced at one DAAC require inputs being produced at another DAAC. The predicted production time of remote input products will be used in creating local production plans. The primary mechanism for cross-DAAC planning will be the use of Predicted Data Availability Schedules (PDAS), created when a plan is created. A DAAC's PDAS will be made available to remote DAACs via the Data Server Subsystem.

Production Rules

Production rules are the instructions about how a particular PGE is to be run. The instructions specify a wide range of information such as the input and output data types, the frequency of execution, activation conditions and error handling instructions.

A single PGE may use one or more sets of production rules, known as PGE profiles, since it may be desirable to run the same PGE with different input data sets, or activation conditions. The production rules are entered when a PGE undergoes Science Software Integration and Test (SSI&T) at the DAAC. Where applicable, default parameter values are entered at that time. The initially selected runtime parameters, metadata check parameters, tile IDs, and many of the default parameters can be overridden in the production environment when a Production Request is entered.

Production rules define the PGE to the Planning and Data Processing Subsystems (PDPS). The following types of conditions can be specified for each PGE:

- The time period for which the PGE will run.
  - A PGE can run every hour, every day, or for every orbit of a satellite. The frequency of how often a PGE runs must be defined to PDPS so that it knows when to plan and execute the PGE. A definition of a satellite's orbit could be included if the PGE were to be executed for some number of satellite passes.
- PGE Inputs.
  - A PGE can have any number of inputs. The types of the inputs and how frequently they are available helps determine on what basis the PGE is scheduled.
  - Most inputs to a PGE are retrieved based on time; the specified inputs are retrieved from the Data Server Subsystem for the time which the PGE is defined to execute. Production Rules allow other conditions to be added to the mix, such as checks or queries against the metadata of the input granules, or the lists of inputs as alternates (for when a primary input is not available) or optionals (for inputs without which the PGE can still run successfully). If inputs are defined as alternate or optional, the number of inputs staged for the execution of the PGE may vary from one run to the next.
- PGE Outputs.
  - A PGE can have any number of outputs. The characteristics of the outputs can have effects on any downstream PGEs that use them as inputs. For example, it is possible for an output to be defined as optional, in which case it may or may not even be produced. (When an output is not generated, it cannot be used as input for a downstream PGE.)
- Runtime Parameter Values.
  - A PGE can have any number of runtime parameters, which are values that are placed in the process control file (PCF) under specified logical IDs before the PGE executes. The PGE treats them as constants and normally they are set either during SSI&T or when the Production Request is entered.
  - For some production rules (such as Orbital Processing) there is specific information that can be placed in a runtime parameter if so desired by the PGE.
- Geographic Tiles.
  - A PGE can define a geographic location for which it will process data. Tiles are defined through production rules, and change the staging of inputs from time-

based, to a combination of time- and geographically-based. Data are retrieved based on their location on the Earth with respect to the tile that it is currently being processed.

Some (but not all) production rules can work with other production rules.

Production rules are often used for the selection of dynamic inputs.

- **Dynamic inputs** can be either internal or external.
  - **Dynamic internal** inputs are produced by other PGEs (they are called dynamic internal inputs because they are produced at an ECS DAAC).
  - **Dynamic external** inputs are periodically ingested and stored in the Data Server Subsystem (they are termed dynamic external inputs because they are produced outside of the DAAC).
- **Static inputs** are granules that are inserted during the SSI&T process and are retrieved not on the basis of time but by Earth Science Data Type (ESDT) and science group.
  - The Metadata Query Production Rule is the only production rule that works for choosing static inputs.

PGE profiles allow a PGE to be defined to PDPS multiple times, each with a different set of inputs, outputs, or even scheduling information. Each PGE's definition is made up of its name, its version and its profile number. Different PGE name/version pairs define different PGEs to PDPS. The addition of the profile allows for multiple definitions of a PGE name/version pair. There can be up to 99 profiles for each PGE.

Syntax of Production Rules

Production rules are defined in the following two ways:

- Through science metadata that is entered in various types of files during the SSI&T process.
- By entering parameter values when a Production Request is created to schedule the PGE.

During SSI&T, production rules are defined in files written in Object Description Language (ODL) in a parameter equals value format. There are three general categories of ODL files:

- PGE Science Metadata ODL Files.
- ESDT Science Metadata ODL Files.
- Production Rule-Specific Science Metadata ODL Files.
  - Orbit Definition ODL Files.
  - Path Map Definition ODL Files.

– Tile Definition ODL Files.

When a Production Request is created to schedule a PGE, it is necessary to enter certain information that is essential to implementing the production rules that affect the particular PGE. The information may concern the date and time-range

PGE Science Metadata ODL Files

The PGE science metadata ODL file defines a PGE (or at least the current plan for its operation) to PDPS. It specifies everything from the PGE name and version, to the period for the PGE (how often it runs), all inputs and outputs, any runtime parameters and any exit messages or dependencies. A template version of the PGE science metadata ODL file is created by the **SSIT Create ODL Template** program from a PCF from the PGE.

ESDT Science Metadata ODL Files

The ESDT science metadata ODL file defines a PGE input or output to PDPS. Each input and output of a PGE must have a corresponding ESDT science metadata ODL file defined. It describes everything that PDPS needs to know about the subject input or output file, from its name and version, to its period (how often data is collected), to where it is used and archived. Note that many PGEs can use the same input or output type, and thus can share the same ESDT science metadata ODL file.

Unlike the PGE science metadata ODL file, there is no tool for automatically generating a template ESDT science metadata ODL file. A template version exists under the data directory called ESDT_ODL.template. The template must be copied to a file that follows the naming convention *ESDTShortName#ESDTVersionID*.odl.

Production Rule-Specific Science Metadata ODL Files

The production rule-specific science metadata ODL files provide specific information to PDPS about production rules used by a PGE. They are needed only when the PGE is subject to one of the following conditions:

- Is executed on the basis of a satellite orbit.
- Needs to know the orbital path of a satellite.
- Requires data based on geographic tiling of the Earth.

Since not every PGE is based on orbits or tiles, not all PGEs require these files. The comments in the PGE_ODL.template describe when setting a specific parameter means that a production rule-specific science metadata ODL file needs to be created.

The production rule-specific science metadata ODL files are broken into three types, which are defined as follows:

- Orbit ODL File.
  - Defines the orbital period of the satellite from which the PGE's input data is created.
  - Defines when a given orbit starts, how long it lasts, and the number of the orbit.
  - PDPS uses the information in the orbit ODL file to extrapolate future orbits and is able to plan PGEs that are required to run every so many orbits of the satellite.
- Pathmap ODL File.
  - Defines the mapping between the cyclic 0-233 orbits that the satellite makes with the actual path number that the PGE requires.
  - PDPS computes the path number from the orbit number (specified in the orbit ODL file) by incrementing it until it reaches the 233 maximum, then resetting it to zero.
  - Many instruments expect the path number to be a fixed swath on the Earth, so it is not just incremented for each satellite pass.
  - The pathmap ODL file creates a mapping from the sequential path numbers to the path numbers expected by the PGEs.
- Tile ODL File.
  - Defines the coordinates of the tiles used by some instruments to specify geographic locations on the Earth.
  - The tile definitions are used by PDPS to schedule the PGE (one execution per tile) and to acquire the necessary data (using the geographic coordinates to acquire data for the tile being processed only).

Unlike the PGE science metadata ODL file, there is no tool to automatically generate a template production rule-specific science metadata ODL file. Because the files themselves tend to be small, this is not usually a problem. A template version of each kind of production rule-specific science metadata ODL file (e.g., ORBIT_ODL.template, TILE_ODL.template) exists in the /usr/ecs/<MODE>/CUSTOM/data directory on the AIT Workstation. The templates must be copied, named properly, and edited in order to create the appropriate production rule-specific science metadata ODL file.

Release 5 Production Rules

The following statements provide some simplified descriptions of production rules that are scheduled to be made available in Release 5:

- **Basic Temporal** - Temporal (time) range of inputs matches the temporal range of outputs.
- **Advanced Temporal** - Temporal range of inputs is offset from the expected temporal range of inputs and outputs.
- **Alternate Inputs** - PGE is run with different inputs based on the availability of various alternate input data sets.
- **Optional Inputs** - PGE is run with specified optional inputs if available; otherwise, PGE is run without them.
- **Minimum/Maximum Number of Granules** - Minimum number of input granules needed for full data coverage and maximum number of input granules to search for may be specified. Minimum and maximum number of outputs expected from the PGE may be specified.
- **Optional DPRs –** The only DPRs executed are those for which the non-routine key input data actually become available (i.e., are either produced in data processing or can be acquired from the archive).
- **Intermittent Activation** - Every n^{th} DPR is activated; all other DPRs are skipped.
- **Metadata Checks** - DPR is run only if input data's metadata value(s) meet(s) certain criteria.
- **Metadata Query** - Input granule selection is based on metadata value.
- **Data Day** - Input data selection is based on Data Day.
- **Spatial Query** - Input granule selection is based on the spatial coverage of another input (i.e., the key input).
- **Tiling** - Input data is chosen on the basis of Instrument Team-defined tiles (geographic areas).
- **Closest Granule –** DPR is generated if a required input granule within a particular time range (rather than an exact time) is available; otherwise, no DPR is generated. (Supersedes the Most Recent Granule Production Rule)
- **Orbital Processing** - Selection of input times is based on orbit information.

Basic Temporal Production Rule

The Basic Temporal Production Rule defines the timeframe for the PGE along with its input and output data. PGEs subject to the Basic Temporal Production Rule generally have the following characteristics in common:

- Typically scheduled to run using input data that become available periodically (every hour, every day, etc.).
- Use input data for a particular period of time.
- Produce output for a specified length of time.

The data the PGE takes in (its input) and the data it produces (its output) have the same period (or some subset of the same period) as the PGE.

- Example One:
  - A MODIS PGE processes data for five-minute intervals, producing Level 1B granules.
  - The PGE requires as input the specific five-minute Level 1A granule that is contemporaneous with (covers the same five-minute time period as) the Level 1B granule to be produced.
  - Using the Basic Temporal Production Rule, a five-minute Level 1A granule is staged as input to the PGE and a five-minute Level 1B granule is expected as output, both matching the timeframe for which the PGE is run.
- Example Two:
  - A CERES PGE processes data for 24-hour intervals, producing 24-hour Level 1A granules as output.
  - As input the PGE takes Level 0 data that is ingested every two hours.
  - Using the Basic Temporal Production Rule, twelve two-hour Level 0 granules are staged as input to the PGE and a 24-hour Level 1A granule is expected as output, matching the timeframe for which the PGE is run.

The fundamental elements used to define the Basic Temporal Production Rule are “period: and “boundary.”

- **Period** is the length of time for which a PGE processes data or the length of time for which input and output data is collected.
  - A PGE that is subject to the Basic Temporal Production Rule only and that processes data in two-hour blocks, takes in data that relates to a particular two-hour interval and produces output data for that same two-hour period.
  - Data that has a period of 15 minutes was collected or produced for a 15-minute time period.

- **Boundary** is the starting point for the data or PGE.
  - Depending on the characteristics of the data or PGE, the boundary may be the start of a minute or hour or day or week (etc.).
  - If a PGE's boundary is the start of the hour, it processes data that starts every hour and runs on data for the length of its period.
  - If data comes in every day, PDPS predicts that the data is going to be available at the start of the day and allows scheduling of PGEs that use the data as input accordingly.

Both the PGE itself and the input data have a boundary and period associated with them. That is how PDPS determines the frequency of processing for a Basic Temporal PGE and the time period for its inputs and outputs.

PDPS uses **period** and **boundary** in combination to plan the processing of each PGE, including determining its input requirements and anticipated output (which may be input to other PGEs). If a PGE has a period of one hour and a boundary of “start of day,” it is scheduled every hour, beginning at midnight. If an input has a period of 15 minutes and boundary of “start of hour,” PDPS predicts it every 15 minutes beginning on the hour.

Boundary offset is an addition to the Basic Temporal Production Rule that allows a PGE or data to start on an offset from a given boundary. For example, if a PGE would normally run every day but not start until two or three hours into the day (e.g., beginning at 3:00 a.m. instead of midnight), a boundary offset can be used to add three hours to the “start of day” boundary. This would mean the PGE would run on data that occurred three hours after the boundary.

Data with offset times refers to data where the start time is a few minutes off of the start time that PDPS expects. For example: if data is defined to PDPS as follows:

```
BOUNDARY = "START_OF_HOUR"
PERIOD   = "HOURS=1"
```

but the data actually starts at 1:05 and ends at 2:05, the data is said to have **offset times**. There is a flag in the production rule syntax that tells PDPS to shift granule time specifications to match the granules in the archive.

The **end-of-month anomaly** is an addition to the Basic Temporal Production Rule that allows a PGE or data to cover a specific number of days within a month. The month is broken into thirds. The first third is composed of the first 10 days of the month. The second third consists of days 11 through 20. And the last third varies in length depending on the total number of days in the month (i.e., for November it would have 10 days; for December it would have 11 days). A specific **boundary** and **period** allow a PGE or its data to be scheduled into thirds of a month.

Figure 5 provides an illustration of the Basic Temporal Production Rule. The PGE has a boundary of “start of day” and a period of one hour, so it is scheduled for every hour through the day. If a Production Request were entered for two full days of processing, a DPR would be created for the PGE to run every hour; i.e., 48 DPRs total. If a Production Request were created for a four-hour period in the middle of a single day (for example, from 12:00 noon to 4:00 p.m.), then four DPRs would be created, one for 12:00-1:00, one for 1:00-2:00, one for 2:00-3:00, and one for 3:00-4:00.

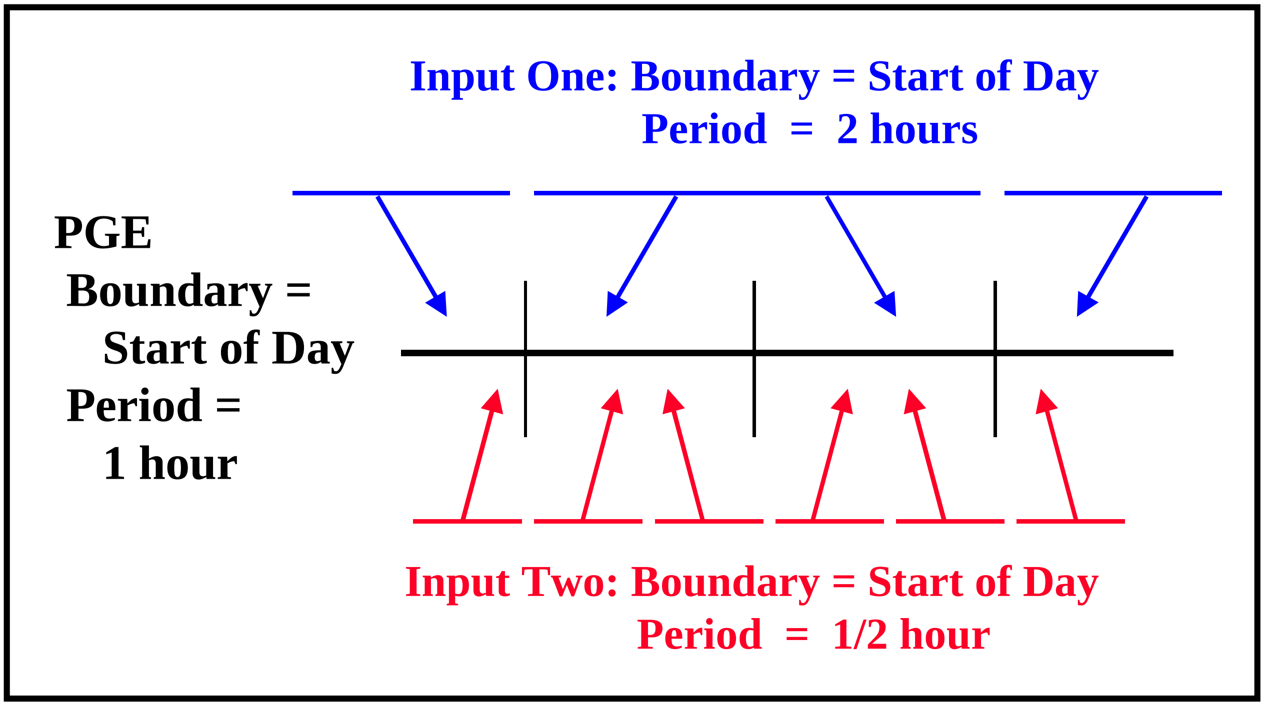

Figure 5. Example of the Basic Temporal Production Rule

In the example (Figure 5), Input One has a boundary of "start of day" and a period of two hours, so when PDPS plans for its availability, it expects a granule every two hours beginning at midnight. Consequently, each granule of Input One is associated with two DPRs for the PGE, because the PGE encompasses only one hour of the two-hour granule's period.

Input Two has a boundary of "start of day" and a period of ½ hour, so when PDPS plans for its availability, it expects a granule every ½ hour beginning at midnight. As a result two granules of Input Two are associated with each DPR for the PGE, because the PGE encompasses an hour of the ½-hour granule's Period. Thus, every DPR of the PGE will wait for two granules of Input Two to arrive before it can be processed.

PGE Science Metadata ODL File Parameters

The following parameters must be set properly in the applicable PGE science metadata ODL file in order to implement the Basic Temporal Production Rule:

- SCHEDULE_TYPE.
- PROCESSING_PERIOD.
- PROCESSING_BOUNDARY.

The SCHEDULE_TYPE parameter specifies the type of scheduling that will be done for the PGE. The following values are applicable to the Basic Temporal Production Rule:

- "Time"
  - The PGE is scheduled on the basis of the specified boundary/period and the availability of data for that boundary/period.
- "Snapshot"
  - The PGE is scheduled for a single date/time.
  - Note that PROCESSING_PERIOD and PROCESSING_BOUNDARY are **not** needed when "Snapshot" is specified.

Other values for SCHEDULE_TYPE apply to other production rules, such as the following values:

- “Data"
  - The PGE is scheduled on the basis of the availability of data produced by other PGEs.
- "Tile"
  - The PGE is scheduled based on the definition of geographic tiles.
- "Orbit"
  - PGE scheduling is based on the orbit of the spacecraft.

The PROCESSING_PERIOD parameter describes the length of time for which the PGE executes. Data will be acquired (barring any combination of Production Rules) for the specified period and output data will be planned for the given period. It is of the format "<Period Type>=<Length of Period>". Note that “length of period” can be specified as a positive integer only. The following values are acceptable “period type” entries for the Basic Temporal Production Rule:

- "YEARS"
  - PGE processes data applicable to a given year or years.
  - "YEARS" might be specified for a PGE that computes a yearly average.
  - For example, PROCESSING_PERIOD = "YEARS=1" relates to a PGE that processes one year’s worth of data.
- "MONTHS"
  - PGE processes data applicable to a particular month or several months.
  - “MONTHS” is most likely to be used for some kind of averaging PGE.

  - For example, PROCESSING_PERIOD = "MONTHS=2" relates to a PGE that processes two months’ worth of data at a time.

- "THIRDS"
  - PGE processes data applicable to some number of thirds of the month.
  - For example, PROCESSING_PERIOD = "THIRDS=1" relates to a PGE that processes data applicable to 1/3 of the month.
- "WEEKS"
  - PGE processes data applicable to some number of weeks.
  - For example, PROCESSING_PERIOD = "WEEKS=2" relates to a PGE that processes two weeks’ worth of data every time it runs.
- "DAYS"
  - PGE processes data applicable to some number of days.
  - For example, PROCESSING_PERIOD = "DAYS=5" relates to a PGE that processes five days’ worth of data.
- "HOURS"
  - PGE processes data applicable to some number of hours.
  - For example, PROCESSING_PERIOD = "HOURS=4" relates to a PGE that processes four hours’ worth of data when it is executed.
- "MINS"
  - PGE processes data applicable to some number of minutes.
  - For example, PROCESSING_PERIOD = "MINS=5" relates to a PGE that processes five minutes’ worth of data.
- "SECS"
  - PGE processes data applicable to some number of seconds.
  - For example, PROCESSING_PERIOD = "SECS=2" relates to a PGE that runs on two seconds’ worth of data.

There are other types of values for PROCESSING_PERIOD but they apply to other production rules (as described in the applicable sections of the lesson).

The PROCESSING_BOUNDARY parameter specifies the boundary (starting point in time) of the PGE. It tells when each instance of the PGE should start. Note that the PROCESSING_BOUNDARY and PROCESSING_PERIOD are used in conjunction to schedule the PGE.

The following PROCESSING_BOUNDARY values are used for implementing the Basic Temporal Production Rule:

- "START_OF_HOUR" – PGE processes data for each hourly interval.
- "START_OF_6HOUR" - PGE processes data for every 6-hour interval.
- "START_OF_DAY" - PGE processes data for every daily interval.
- "START_OF_WEEK" - PGE processes data for every weekly interval.
- "START_OF_ONE_THIRD_MONTH" - PGE processes data for every 1/3 of a month.
- "START_OF_MONTH" - PGE processes data for every monthly interval.
- "START_OF_YEAR" - PGE processes data for every yearly interval.
- "START_DATE=*DD/MM/YYYY*" - PGE processes data for the specified date only.

There are other values for PROCESSING_BOUNDARY that apply to other production rules (as described in the applicable sections of the lesson).

Handling Data with Offset Times

When the ALIGN_DPR_TIME_WITH_INPUT_TIME flag is set to "Y" (i.e., ALIGN_DPR_TIME_WITH_INPUT_TIME = “Y”) PDPS shifts the expected times for input data to the actual times found in the archive. If the flag is NOT set, data with offset times can cause problems when generating Production Requests.

ESDT Science Metadata ODL File Parameters

The following parameters must be set properly in the applicable ESDT science metadata ODL file in order to implement the Basic Temporal Production Rule:

- DYNAMIC_FLAG.
- PERIOD.
- BOUNDARY.

The DYNAMIC_FLAG describes the type of data that is defined in the ESDT science metadata ODL file. It specifies to PDPS what kind of data the PGE requires as input or produces as output. It can have any of the following four possible values, all of which are valid for Basic Temporal data:

- "S"
  - Static Data.
  - Data do not change at regular intervals.
  - The same granule can be used as input for many runs of the PGE.

    - Calibration files are a good example of static data.
- "I"
    - Dynamic Internal.
    - Data are produced by a PGE running at the local DAAC.
    - All output products are either “dynamic internal” or “interim” kinds of data.
- "E"
    - Dynamic External.
    - Data are produced by an external source (not a PGE running at the local DAAC).
    - EDOS data is a primary example.
    - Dynamic external can be set for PGE inputs only.
- "T"
    - Interim/Intermediate.
    - Data are stored only temporarily by the Data Server Subsystem.

The PERIOD parameter specifies the length of time covered by the data. Data are expected to be either ingested or produced for the length of the PROCESSING_PERIOD described in PGE science metadata ODL files. However, the PERIOD of the data does **not** have to match the PROCESSING_PERIOD defined for the PGE. PDPS plans for data where the ESDT period is less or more than the processing period of the PGE that uses it. For example, if the PGE PROCESSING_PERIOD = "HOURS=1" and the input data PERIOD = "MINS=5", then PDPS plans to acquire twelve granules of the input data to cover the PROCESSING_PERIOD.

The following “period type” values are used for implementing the Basic Temporal Production Rule:

- "YEARS"
    - Data span a year or years.
    - “YEARS” might be selected for a yearly average output product.
    - For example, PERIOD = "YEARS=1" specifies data that cover a period of a year.
- "MONTHS"
    - Data span a month or several months.
    - “MONTHS” is most likely used for some kind of averaging output product.
    - For example, PERIOD = "MONTHS=2" specifies data that cover a period of two months.

- "THIRDS"
  - Data span some number of thirds of a month.
  - For example, PERIOD = "THIRDS=1" specifies data that cover a period of 1/3 month.
- "WEEKS"
  - Data span some number of weeks.
  - For example, PERIOD = "WEEKS=2" specifies data that cover a period of two weeks.
- "DAYS"
  - Data span some number of days.
  - For example, PERIOD = "DAYS=5" specifies data that cover a period of five days.
- "HOURS"
  - Data span some number of hours.
  - For example, PERIOD = "HOURS=4" specifies data that cover a period of four hours.
- "MINS"
  - Data span some number of minutes.
  - For example, PERIOD = "MINS=5" specifies data that cover a period of five minutes.
- "SECS"
  - Data span some number of seconds.
  - For example, PERIOD = "SECS=2" specifies data that cover a period of two seconds.
- "ORBITS"
  - Data span some number of orbits of the spacecraft.
  - For example, PERIOD = "ORBITS=1" specifies data that cover one orbit.
  - A PGE can be time-scheduled (using the Basic Temporal Production Rule) but use orbit-based data.

The BOUNDARY parameter is the starting point in time of the data granule. It tells when each data granule should start. Note that the BOUNDARY and PERIOD are used in conjunction to determine the starting and ending time for the granules.

The following values for BOUNDARY apply to the Basic Temporal Production Rule:

- "START_OF_HOUR"
  - Data granules start every hour.
- "START_OF_6HOUR"
  - Data granules start every six hours.
- "START_OF_DAY"
  - Data granules start every day.
- "START_OF_WEEK"
  - Data granules start every week.
- "START_OF_ONE_THIRD_MONTH"
  - Data granules start every 1/3 of a month.
- "START_OF_MONTH"
  - Data granules start every month.
- "START_OF_YEAR"
  - Data granules start every year.
- "START_OF_ORBIT"
  - Data granules start every orbit.

Advanced Temporal Production Rule

The Advanced Temporal Production Rule allows for input data to be acquired for a time period other than that of the PGE or its planned inputs/outputs. It provides an offset mechanism, specifying on an input basis that the data required for processing is some number of seconds earlier or later than the planned time period for the PGE.

- Example One:
  - A PGE requires data from its previous execution for interpolation purposes (e.g., one of its inputs is the output of the very same PGE the last time that it ran).
  - If the PGE processes data for each one-hour interval (producing an hourly product), the Advanced Temporal Production Rule is specified with an offset of minus 3600 seconds (one hour) for the input of the ESDT produced by previous runs.
- Example Two:
  - A PGE takes as input two-hour Level 0 data to produce an L1A product.

- Because the edges of the Level 0 data can be difficult to process without preceding and succeeding data, the PGE requires three Level 0 granules, one from the time period before it runs, one for the time period it is currently processing and one for the next time period.
- The PGE is defined as having three inputs, the first with an Advanced Temporal offset of minus 7200 seconds (two hours), the second with no Advanced Temporal offset and the third with an Advanced Temporal offset of plus 7200 seconds (two hours).

The Advanced Temporal Production Rule uses the times specified in the Basic Temporal Production Rule as a reference point for specifying offset(s) to request data from a “period” and/or “boundary” different from that of the DPR or its input. The offsets are specified as either negative or positive numbers to indicate whether the time period of the input data is before or after that of the DPR (a particular run of a PGE).

- **Begin Period Offset** is an amount of time (in seconds) that is specified with respect to the DPR start time. A negative beginning offset requests data that was collected before the DPR start time. A positive beginning offset requests data with a collection time after the start time of the DPR.
- **End Period Offset** is an amount of time (in seconds) that is specified with respect to the DPR end time. A negative ending offset requests data that ended collection before the DPR end time was reached. A positive ending offset requests data that ended collection after the end time of the DPR boundaries.

Note that the beginning and ending offsets are not absolute cut-offs for data. Overlapping granules (granules that start or end outside of the offsets) will be staged as inputs to the DPR.

Figure 6 provides an illustration of the Advanced Temporal Production Rule. The PGE shown in the example processes data for every one-hour interval. However, Input One comes in at two-hour intervals and Input Two is produced every 1/2 hour.

Both the Begin Period Offset and End Period Offset for Input One are -7200 seconds (minus two hours). Consequently, every DPR will stage the "previous" Input One. This could be used to get the "previous" or "next" granule of an input.

The Begin Period Offset for Input Two is zero, meaning that it will match the Start Time of the DPR. The End Period Offset is +1800 seconds (plus 1/2 hour). Therefore, all Input Two granules will be staged that fall within the time period of the DPR plus 1/2 hour. The effect is to acquire all Input Two granules within the time period of the DPR, plus the one from the next 1/2-hour time period, for a total of three granules. The additional granule acquired by means of the End Period Offset might be used for interpolation purposes at the end point.

The same types of parameter settings that apply to the Basic Temporal Production Rule apply to the Advanced Temporal Production Rule. In addition, there are some parameters in the PGE science metadata ODL file that apply specifically to the Advanced Temporal Production Rule. However, the values applicable to the Basic Temporal Production Rule must be set before the Advanced Temporal Production Rule syntax is added.

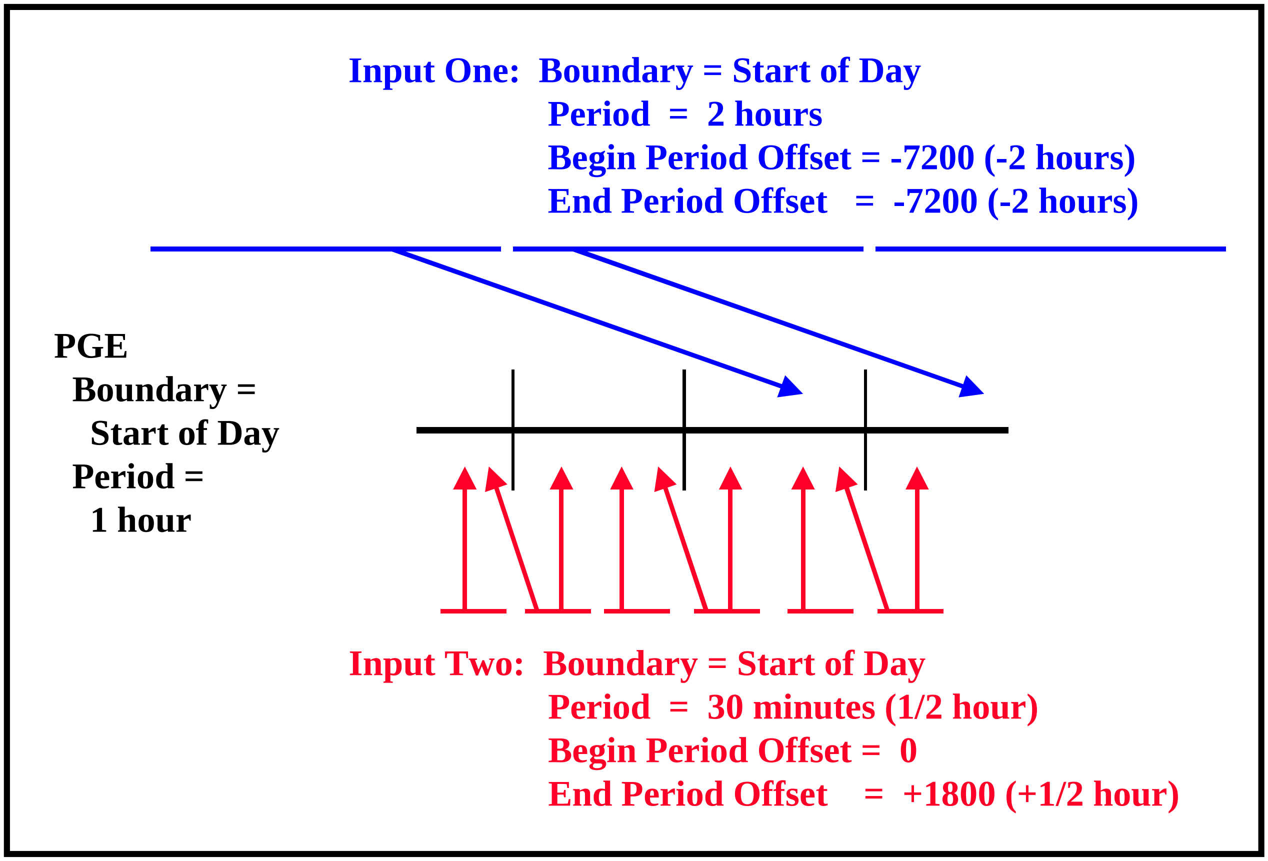

Figure 6. Example of the Advanced Temporal Production Rule

PGE Science Metadata ODL File Parameters

During the SSI&T process the PGE science metadata ODL file is generated from the PCF delivered with the science algorithm. A PCF_ENTRY object is generated for each file entry in the PCF. In order to implement the Advanced Temporal Production Rule the PCF_ENTRY object for each type of input file to which the rule applies uses the following syntax:

```
OBJECT = PCF_ENTRY
    .
    .
    .
    BEGIN_PERIOD_OFFSET =
    END_PERIOD_OFFSET =
    .
    .
    .
END_OBJECT = PCF_ENTRY
```

Accordingly, the following parameters must be set properly in order to implement the Advanced Temporal Production Rule:

- BEGIN_PERIOD_OFFSET.
- END_PERIOD_OFFSET.

BEGIN_PERIOD_OFFSET is the offset added to or subtracted from the Data Start Time of the DPR. The value assigned to BEGIN_PERIOD_OFFSET can be either a positive or negative value, specified in seconds. If the value is positive, it is added to the Data Collection Start Time (looking for the input forward in time). If the value is negative, it is subtracted from the Data Collection Start Time (looking backward in time). For example, BEGIN_PERIOD_OFFSET = -3600 requests data that was collected one hour (3600 seconds) before the DPR start time.

END_PERIOD_OFFSET is the offset added to or subtracted from the Data Collection End Time of the DPR. The value assigned to END_PERIOD_OFFSET can be either a positive or negative value, specified in seconds. If the value is positive, it is added to the Data Collection End Time (looking for the input forward in time). If the value is negative, it is subtracted from the Data Collection End Time (looking backward in time). For example, END_PERIOD_OFFSET = +2700 requests data that was collected 45 minutes (2700 seconds) after the DPR end time.

The BEGIN_PERIOD_OFFSET and END_PERIOD_OFFSET parameters can be specified for any input PCF_ENTRY in the PGE science metadata ODL file. If not specified, the parameters are set to zero (0) and the Advanced Temporal Production Rule does not apply to the PGE.

Alternate Input and Optional Input Production Rules

The Alternate Input and Optional Input Production Rules are very similar and use much the same processing in PDPS. Both rules allow a PGE to select various inputs based on timers and priority lists. The major difference is that Alternate Inputs requires that one of alternates on the list be used, whereas Optional Inputs allows successful execution of the PGE if no optional input on the list is available.

The Alternate Input Production Rule allows for a PGE to evaluate a list of inputs in priority order and be scheduled and executed with the best priority input that could be found. In essence, a PGE using Alternate Inputs is saying "I would like to run with Input A, but if it's not available, I am willing to run with Input B." A timer can be used to specify how long to wait for a given alternate choice before proceeding with a choice of lesser priority. The PGE is not executed until one of the alternate choices has been found.

- Example:
  - A PGE requires model wind data as an input but is capable of accepting wind data from a Data Assimilation Office (DAO) model, a National Centers for Environmental Prediction (NCEP) model, or (as a last resort) climatology.
  - The PGE would use the Alternate Input Production Rule to list each input in priority order, giving a timer value for how long to wait before trying the next input.

- If the DAO data are most desirable, DAO would be listed as first choice or "primary" data.
- NCEP would be the second choice.
- Climatology would be the last choice.
- If a timer value is specified for DAO data, the PGE will wait for that timer to expire before running with either NCEP data or climatology.
- If a timer had been placed on the NCEP input, the PGE would wait before running with the climatology data.

The Optional Input Production Rule allows for a PGE to list inputs that are desired but not required for it to execute. The inputs are ranked as previously stated and timers are set to wait before choosing a lower-priority type of input. However, if none of the inputs on the list becomes available, the PGE starts because the alternatives are classified as "optional." In essence the PGE is saying "I would like to run with Input A, but if its not available, I can run (and produce reasonable output) without it."

- Example:
  - It would be preferable to run a particular MODIS PGE with the output of a MISR PGE as input.
  - However, the MISR output may not be produced every day.
  - So the MODIS PGE lists the MISR input as optional with a two-hour timer.
  - On those occasions when no MISR output is produced, the MODIS PGE waits for two hours and then is executed without the MISR input.

Figure 7 provides an illustration of the Alternate Input Production Rule. The PGE in the illustration has two inputs that are “required” so they must available for the PGE to be run. It also has one input that is “alternate.” The alternate input can be one of three choices, the first choice is the **primary**, then there are second and third choices.

After the pair of required inputs has become available, the alternate inputs are evaluated as follows:

- If the primary alternate is available, it is used as input and the PGE is scheduled for execution.
- There is a one-hour timer on the primary alternate. If the primary alternate is unavailable, the PGE waits until the primary alternate becomes available or the one-hour timer expires, whichever occurs first.
- If the second alternate is available after the timer for the primary alternate has expired, the second alternate is used as input and the PGE is scheduled for execution.

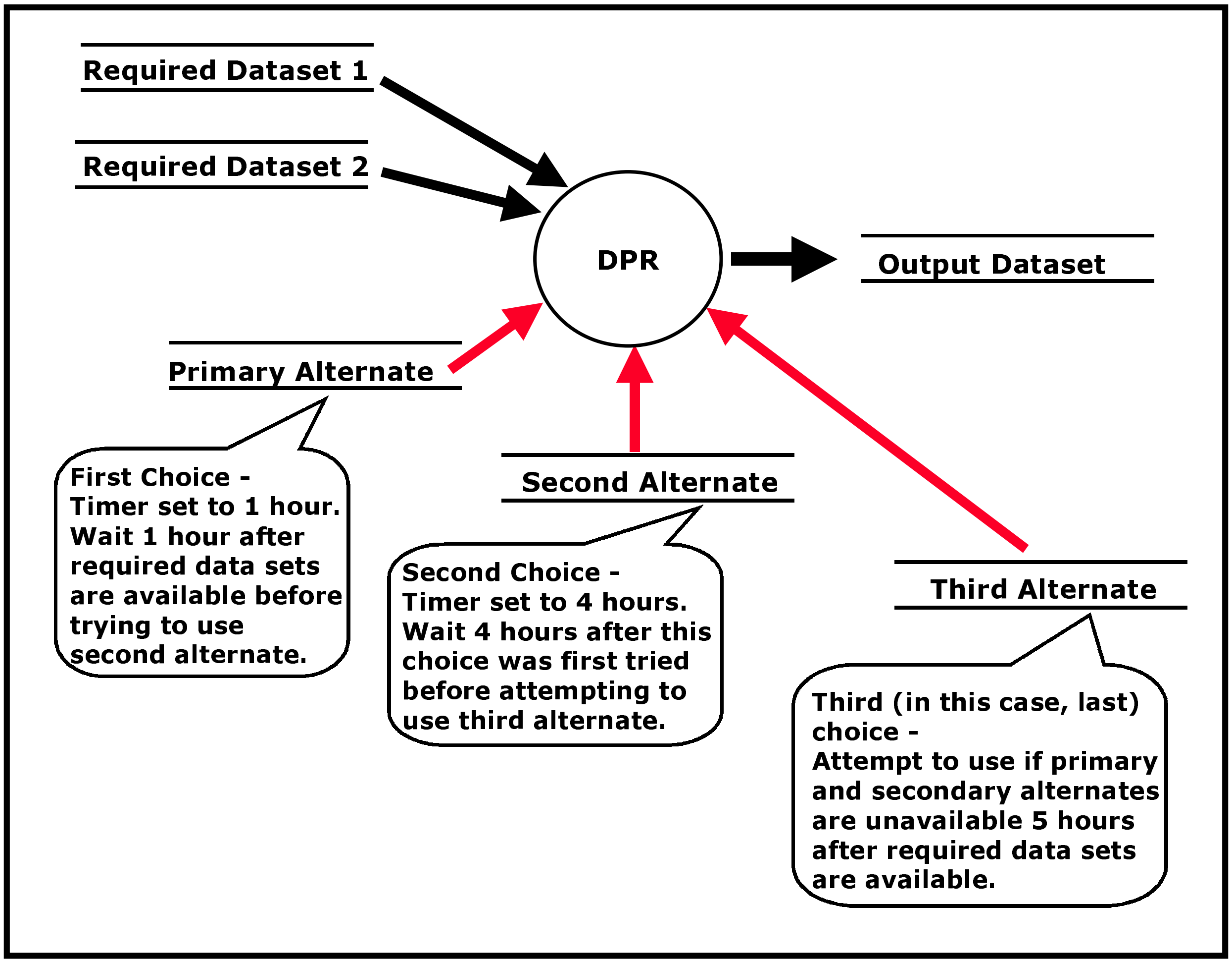

Figure 7. Example of the Alternate Input Production Rule

- There is a four-hour timer on the second alternate. If the second alternate is unavailable, the PGE waits until either the primary alternate or the secondary alternate becomes available or the four-hour timer expires, whichever occurs first.
- If the third alternate is available after the timer for the second alternate has expired, the third alternate is used and the PGE is scheduled for execution.
- There is no timer on the third alternate. If the third alternate is not available, the PGE waits until either the primary alternate, the secondary alternate, or the third alternate becomes available, whichever occurs first.
- The PGE will not start processing until one of the alternates becomes available.

If instead of an alternate the third input for the PGE had been defined as an optional input, the preceding scenario would have been the same, except that if neither the primary alternate, the second alternate nor the third option was available after the timers had expired, the PGE would not wait; it would be scheduled for execution without the third input. It would run with the two required inputs only.

The Alternate Input and Optional Input Production Rules are additions to settings/syntax put into the ODL files for other production rules. Inputs deemed “optional” or “alternate” can be searched for and acquired by other production rules (e.g., Basic Temporal or Metadata Checks/Query). The syntax for the rules used to search for the inputs have to be filled out in addition to the syntax required to make the input an alternate or optional input.

PGE Science Metadata ODL File Parameters

The following parameter must be set properly in the applicable PGE science metadata ODL file in order to implement the Alternate Input or Optional Input Production Rule:

- INPUT_TYPE.

In addition, one of the following two ODL objects is used within a PCF_ENTRY to define either the Alternate Input Production Rule or the Optional Input Production Rule:

- ALTERNATE_INPUT object.
- OPTIONAL_INPUT object.

INPUT_TYPE is a type of data defined by a PCF_ENTRY object (i.e., between OBJECT = PCF_ENTRY and END_OBJECT = PCF_ENTRY). It can have one of four possible values, only three of which are used to define an alternate or optional inputs:

- "Required"
  - A required input.
  - The data must be available or the PGE does not execute.
  - It is the "normal" value for the parameter (i.e., INPUT_TYPE = “Required”); consequently, the input is neither an alternate input nor an optional input.
- "Primary"
  - The primary alternate input.
  - The data is the first choice in a list of alternates.
- "Alternate"
  - An alternate input (except the primary alternate) in a list of alternates.
  - The data is not the first choice in a list of alternates; it is a subsequent choice if the primary (or a higher-priority alternate) is not available.
- "Optional"
  - An optional input.

- –• Availability of the data will be checked and if a timer has been specified, execution of the PGE will wait.
- – The PGE can be executed without the data if it is not available.

Although the Alternate Input and Optional Input Production Rules are similar, there are two different ODL objects used to define them within a PCF_ENTRY; i.e., the ALTERNATE_INPUT object and the OPTIONAL_INPUT object.

The ALTERNATE_INPUT object has the following syntax:

```
OBJECT = PCF_ENTRY
    .
    .
    .
    .
    .
    OBJECT = ALTERNATE_INPUT
        .
        .
        .
    END_OBJECT = ALTERNATE_INPUT
END_OBJECT = PCF_ENTRY
```

The ALTERNATE_INPUT ODL object surrounds an Alternate Input definition. An OBJECT/END_OBJECT pair separates the parameters defining the Alternate Input from the rest of the parameters defining the PCF_ENTRY. The following parameters define an ALTERNATE_INPUT object:

- CLASS.
- CATEGORY.
- ORDER.
- RUNTIME_PARM_ID.
- TIMER.
- WAITFOR.
- TEMPORAL [not implemented].

CLASS is a simple counter used to differentiate the different ALTERNATE_INPUT objects within the file. Since each ALTERNATE_INPUT object resides within a different PCF_ENTRY object, the CLASS for an ALTERNATE_INPUT object can always be 1.

CATEGORY is the name of the list of alternates to which the ALTERNATE_INPUT belongs. The PDPS uses CATEGORY to associate different alternates within a list. CATEGORY can be set to any string value of 20 characters or less (e.g., CATEGORY = "Snow Ice"). Alternates that are part of the same list should have matching CATEGORY values.

ORDER is the numerical place that the particular alternate holds in the list of alternates. The first choice or Primary Alternate (with the INPUT_TYPE = "Primary") should have ORDER = 1.

RUNTIME_PARM_ID specifies the Logical ID (in the PCF) for which the PGE will find the Logical ID of the alternate chosen. Since all alternates must be contained within different PCF_ENTRY objects, they all must have different Logical IDs (but all alternates within the same CATEGORY should have the same value of RUNTIME_PARM_ID). The RUNTIME_PARM_ID parameter specifies the Logical ID of a runtime parameter that the PGE may read to find out which alternate was chosen for the particular execution of the PGE.

The TIMER parameter specifies how long to wait for the particular alternate before checking for the next alternate in the list. The parameter value is expressed in the format "<Period Type>=<Length of Period>". Note that "Length of Period" can be specified as a positive integer only. The Alternate Input Production Rule accepts the following "Period Type" values:

- "WEEKS"
  - PDPS should wait for some number of weeks before searching for the next alternate in the list.
  - For example, TIMER = "WEEKS=2" would make PDPS wait two weeks before checking for the next alternate input.
- "DAYS"
  - PDPS should wait for some number of days before searching for the next alternate in the list.
  - For example, TIMER = "DAYS=5" would make PDPS wait five days before checking for the next alternate input.
- "HOURS"
  - PDPS should wait for some number of hours before searching for the next alternate in the list.
  - For example, TIMER ="HOURS=4" would make PDPS wait four hours before checking for the next alternate input.
- "MINS"
  - PDPS should wait for some number of minutes before searching for the next alternate in the list.
  - For example, TIMER = "MINS=5" would make PDPS wait five minutes before checking for the next alternate input.
- "SECS"
  - PDPS should wait for some number of seconds before searching for the next alternate in the list.

–• For example, TIMER = "SECS=2" would make PDPS wait two seconds before checking for the next alternate input.

The WAITFOR parameter specifies whether or not the PGE can be run without the alternate input. Setting WAITFOR = "N" means that the PGE can run without the input if it cannot be found. In a list of alternate inputs, this would have meaning for the last choice only. If WAITFOR = "Y", the PGE is not executed (even after the last alternate timer expires) until one of the alternates in the list can be found.

The TEMPORAL parameter is an unimplemented feature that would allow for searching for alternates from the same time period but a different date. It is currently stored in the PDPS database but is not used.

The OPTIONAL_INPUT object has the following syntax:

```
OBJECT = PCF_ENTRY
   .
   .
   .
   .
   .
   OBJECT = OPTIONAL_INPUT
      .
      .
      .
   END_OBJECT = OPTIONAL_INPUT
END_OBJECT = PCF_ENTRY
```

The OPTIONAL_INPUT ODL object surrounds an Optional Input definition. An OBJECT/END_OBJECT pair separates the parameters defining the Optional Input from the rest of the parameters defining the PCF_ENTRY. The following parameters define an OPTIONAL_INPUT object:

- CLASS.
- CATEGORY.
- ORDER.
- RUNTIME_PARM_ID.
- TIMER.
- TEMPORAL [not implemented].

The parameters that apply to the Optional Input Production Rule are defined in the same way that the corresponding parameters are defined for the Alternate Input Production Rule. However, note that the Optional Input Production Rule has no WAITFOR parameter. It is irrelevant; in fact, the very essence of the Optional Input Production Rule depends on not “waiting for” the last option but going ahead with the execution of the PGE without the unavailable optional input(s).

Minimum/Maximum Number of Granules Production Rule

The Minimum/Maximum Number of Granules Production Rule makes it possible to specify a range of possible granules for a given input or output for a PGE.

- Inputs.
  - Minimum number of granules the PGE needs for full data coverage.
  - Maximum number of granules for the time period.
- Outputs.
  - Minimum number of outputs that the PGE is expected to produce.
  - Maximum number of outputs that the PGE is expected to produce.

For example, a PGE processes data for every 90-minute interval, has a period of 90 minutes, and takes as input a granule with a period of two hours.

- In many instances one granule of the input will satisfy the PGE.
- In other instances, because of the way the two-hour and 90-minute periods overlap, the PGE needs two input granules to cover the time period.
- Therefore,…
  - Minimum Number of Granules = 1.
  - Maximum Number of Granules = 2.

The Minimum/Maximum Number of Granules Production Rule is different from most production rules because it works for both input and output granules. It allows the PGE to request of a range of inputs (i.e., 1-10 granules), so that it runs with as few as one granule but with as many as ten granules. If a PGE needs at least three granules of a particular input, the minimum number of granules is defined as three and the PGE is not executed until at least three granules are available.

Optional outputs are defined when the Minimum Number of Granules is set to zero. In such cases the PGE can produce none of the particular type of output and still be considered to have executed successfully. If a PGE has a non-zero value for a Minimum Number of Granules associated with an output, and fails to produce any granules of that output type, it is marked as failed.

Figure 8 provides an illustration of the Minimum/Maximum Number of Granules Production Rule. In the example the PGE processes data related to a one-hour period and takes in both Input 1 and Input 2. Since Input 1 has a PERIOD of 1/2 hour, every PGE run requires two Input 1 granules. Input 2 has a PERIOD of 15 minutes, so there are four Input 2 granules for every PGE run.

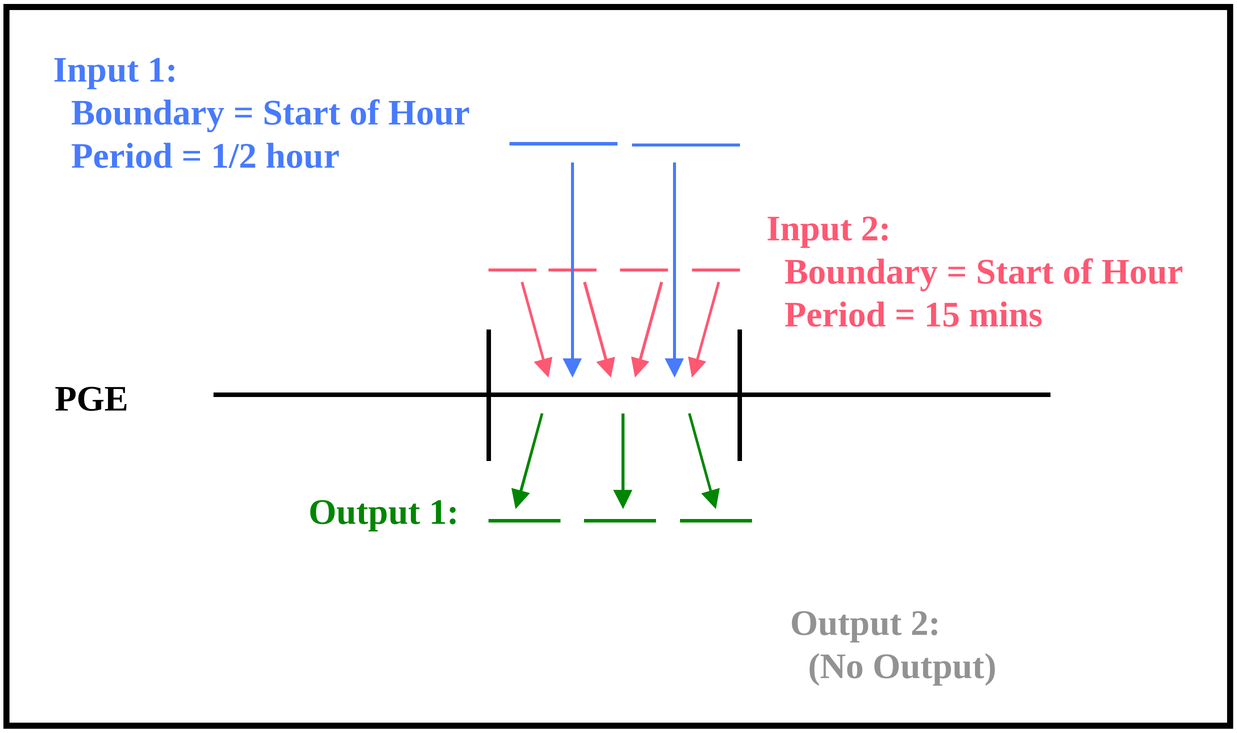

Figure 8. Example of the Minimum/Maximum Number of Granules Production Rule

The PGE produces three Output 1 granules for each run. In this case it does not produce any Output 2 granules.

Minimum and maximum values can affect each input and output as follows:

- Input 1:
  - If Minimum Granules is set to anything equal to or less than two for Input 1, the PGE is scheduled and executed.
  - If Minimum Granules is set to three, the PGE is not scheduled because there are not enough Input 1 granules to make the minimum.
  - If Maximum Granules is set to anything equal to or greater than two for Input 1, the PGE is scheduled and executed.
  - If Maximum Granules is set to one, the PGE is not scheduled because there are too many Input 1 granules (the number exceeds the maximum that the PGE can process).

- Input 2:
  - If the Minimum Granules is set to anything equal to or less than four for Input 2, the PGE is scheduled and executed.
  - If Minimum Granules is set to five, the PGE is not scheduled because there are not enough Input 2 granules to make the minimum.
  - If Maximum Granules is set to anything equal to or greater than four for Input 2, the PGE is scheduled and executed.
  - If Maximum Granules is set to three, the PGE is not scheduled because there are too many Input 2 granules (the number exceeds the maximum that the PGE can process).
- Output 1:
  - If Minimum Granules is set to anything equal to or less than three for Output 1, the PGE is scheduled and executes successfully.
  - If Minimum Granules is set to four, the PGE is marked as failed because it did not produce the expected number of output granules.
  - If Maximum Granules is set to anything equal to or greater than three for Output 1, the PGE is scheduled and executes successfully.
  - If Maximum Granules is set to two, the PGE is marked as failed because it produced too many output granules.
- Output 2:
  - If Minimum Granules is set to anything other than zero, the PGE is marked as failed because it did not produce the expected number of output granules.
  - If Maximum Granules is set to anything equal to or greater than zero for Output 2, the PGE is scheduled and executes successfully.

The Minimum/Maximum Granules Production Rules are additions to settings/syntax put into the ODL files for other production rules. All Production Rules have a Minimum and Maximum Granule setting for both inputs and outputs, even though both values may be set to one (1).

PGE Science Metadata ODL File Parameters

The PGE science metadata ODL file syntax for implementing the Minimum/Maximum Production Rule for **input** data includes the following types of entries:

```
OBJECT = PCF_ENTRY
   .
   PCF_FILE_TYPE =
   .
```

```
                .
                MIN_GRANULES_REQUIRED =
                MAX_GRANULES_REQUIRED =
                .
                .
                .
            END_OBJECT = PCF_ENTRY
```

Accordingly, the following parameters must be set properly in order to implement the Minimum/Maximum Production Rule:

- PCF_FILE_TYPE.
- MIN_GRANULES_REQUIRED.
- MAX_GRANULES_REQUIRED.

The PCF_FILE_TYPE parameter is defined by integers in the range of 1 to 8 (inclusive). The integers are codes for the following types of files:

- 1 - product input files.
- 2 - product output files.
- 3 - support input files.
- 4 - support output files.
- 5 - user defined runtime parameters.
- 6 - interim/intermediate input files.
- 7 - interim/intermediate output files.
- 8 - temporary input/output.

For inputs (any PCF_ENTRY with a PCF_FILE_TYPE equal to 1, 3 or 6) the following pair of values must be set for each PCF_ENTRY:

- MIN_GRANULES_REQUIRED
  - Minimum number of granules required for the input.
  - A value of zero (MIN_GRANULES_REQUIRED = 0) would mean that the PGE could execute if no granules for that particular input could be found (in effect, the input is an **optional input**).
  - A value of three (for example) would mean that the PGE must have at least three granules of the input before the PGE can be executed.
- MAX_GRANULES_REQUIRED
  - Maximum number of granules for the input that the PGE is able to successfully process.

– A value of four (for example) would mean that the PGE would process at most four granules for the input.

– If MAX_GRANULES_REQUIRED = 4 and more than four granules are found for the given input, the PGE is not executed.

The PGE science metadata ODL file syntax for implementing the Minimum/Maximum Production Rule for **output** data includes the following types of entries:

```
OBJECT = PCF_ENTRY
   .
   PCF_FILE_TYPE =
   .
   .
   MIN_GRANULE_YIELD =
   MAX_GRANULE_YIELD =
   .
   .
   .
END_OBJECT = PCF_ENTRY
```

For outputs (any PCF_ENTRY with a PCF_FILE_TYPE equal to 2, 4 or 7) the following pair of values must be set for each PCF_ENTRY.

- MIN_GRANULE_YIELD
  - Minimum number of granules that the PGE produces for the output.
  - A value of zero (MIN_GRANULE_YIELD = 0) means that the PGE produces no granules for the output (the output is an **optional output**).
  - A value of three (for example) means that the PGE produces at least three granules of the output during a successful execution.
- MAX_GRANULE_YIELD
  - Maximum number of granules that the PGE produces for this output.
  - A value of four (for example) means that at most the PGE produces four granules for the output.
  - Note that sizing of disk space is based on this number, so making it too small could cause problems on the science processor disks.

Optional DPRs Production Rule

The Optional DPRs Production Rule (also called the Data-Scheduled Production Rule) makes the execution of a PGE subject to the availability of a **key input**. The system generates DPRs for every possible instance of the key input data but executes only the DPRs for which data are either produced in data processing or can be acquired from the archive.

The Optional DPRs Production Rule applies to PGEs that process certain kinds of **non-routine data**.

- **Routine Data**
  - Data that can be predicted, that come in at specific intervals and are always of a specified length.
  - Routine data makes it possible for the Basic Temporal Production Rule to schedule PGEs based on their input data.
- **Non-Routine Data**
  - Data that cannot be predicted because they come in at random periods and/or their length is variable.
  - Examples include an "optional" output of an upstream PGE, or data that are archived at random periods (e.g., some forms of ASTER data).

An Optional DPR has as its **key input** a non-routine data type. There are two sets of circumstances that lead to the scheduling of Optional DPRs:

- Every possible time that the input is produced in data processing (i.e., the key input is produced as an "optional" output by an upstream PGE).
- Whenever a new granule (of a particular data type) can be acquired from the archive (e.g., archived data that were inserted at unpredictable times).

An example of the first condition starts with a MODIS PGE that produces a certain product only when the input data were collected during the satellite's "Day" mode. A second MODIS PGE is scheduled to use the optional ("Day"-mode) product from the first MODIS PGE as its key input. The second MODIS PGE is scheduled to run after every instance of the first MODIS PGE; however, only the DPRs that can use the optional products resulting from runs of the first MODIS PGE are executed. The remaining DPRs cannot be executed because there is no input data for them.

The second condition is illustrated by ASTER routine processing, which makes use of the Optional DPRs Production Rule to schedule and execute ASTER PGEs for new data that have been archived. (Note that the DAAC ingests and archives ASTER production data from tapes supplied by the ASTER Ground Data System on a frequent but not entirely predictable basis.) When the Production Planner creates a Production Request for an ASTER PGE, it is necessary to specify the **insertion time** range (i.e., the time period when the desired data were archived) as opposed to the **collection time** (when the satellite instrument gathered the data). DPRs specifying the ASTER PGE are scheduled and executed for the data granules that were actually inserted in the archive during the time period specified in the Production Request.

An illustration of the Optional DPRs production rule is presented in Figure 9. In the figure there are two DPRs (i.e., DPR-1 and DPR-2) for the upstream PGE and two DPRs (i.e., OPT-1 and OPT-2) for the PGE subject to the Optional DPRs Production Rule. The "Optional DPRs" PGE takes as input the optional output of the upstream PGE. When it is executed, DPR-1 produces the optional output, so the dependent DPR (OPT-1) is executed. However, OPT-2 is not executed because DPR-2 (on which OPT-2 depends) does not produce the optional output.

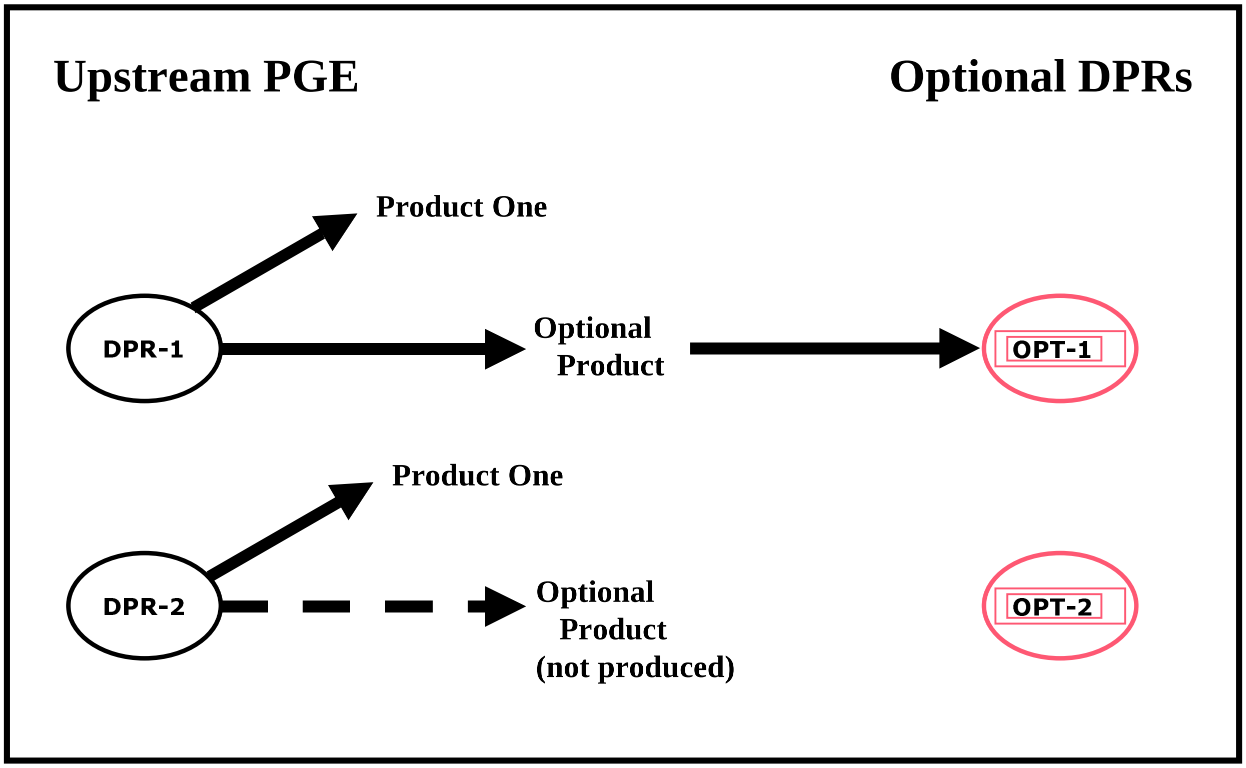

Figure 9. Example of the Optional DPRs Production Rule

The Optional DPRs Production Rule is set up during the SSI&T process. It uses many of the same parameter settings as the Basic Temporal Production Rule so the values specified in the Basic Temporal Production Rule (or other production rules) are set first, then the Optional DPRs Production Rule syntax is added.

PGE Science Metadata ODL File Parameters

The following two types of PGE science metadata ODL file entries must be made in order to set up the Optional DPRs Production Rule:

- SCHEDULE_TYPE.
- KEY_INPUT.

The SCHEDULE_TYPE parameter is set as follows:

- SCHEDULE_TYPE = “Data”
  - This demonstrates the appropriateness of the term “Data-Scheduled Production Rule.”
  - Other schedule types include Time, Tile, Orbit, and Snapshot.

The key input is designated by including the following parameter in the PCF_ENTRY for whichever input is to be the key input:

- KEY_INPUT = “Y”
  - Assigning a value of “Y” to the KEY_INPUT parameter identifies the data as a key input and it is subsequently treated as such.
  - Either assigning a value of “N” to the KEY_INPUT parameter or leaving out the parameter entirely identifies the non-key input data.
  - Only one key input is allowed per PGE profile.

The Production Planner’s role in the implementation of the Optional DPRs Production Rule was described in the MODIS and ASTER examples previously described and varies with the kind of key input:

- Optional output of an upstream PGE (MODIS example).
  - Production Planner creates Production Requests for the PGE subject to the Optional DPRs Production Rule and specifies the same date/time range as for the upstream PGE.
  - Some of the DPRs generated as a result of the Production Request will never run due to lack of input data.
- Ingested on an irregular time schedule (ASTER example).
  - Production Planner specifies the data **insertion time** range when creating Production Requests.
  - All DPRs generated as a result of the Production Requests should be capable of running.

Intermittent Activation Production Rule

The conditions for executing most PGEs are well defined. The most common activation condition is the availability of all input data sets. Similarly, the frequency of execution is usually well defined (e.g., run once for every granule or run monthly averages once a month). However, some PGEs have additional or different constraints on when they are run.

A PGE can be set up to run on every n^{th} instance of input data. For example, a QA PGE that is run on a daily product may need to be run only every fifth day to provide a spot check. Note that this does **not** refer to the common case of running a weekly averaging PGE only once each week, which would be handled by the Basic Temporal Production Rule and the time ranges specified for the input and output ESDTs. Rather, this is a special case where a PGE **can** be run every day (or hour, week, etc.), but for some reason (such as a QA check) it is desired to run the PGE only every n^{th} day.

To implement the Intermittent Activation Production Rule the Production Planner supplies the following information (via the Production Request Editor) when creating a production request:

- **Number to Skip**
  - Number of DPRs to be skipped (not executed).
  - Entered in the **Skip** field on the Production Request Editor.
- **Number to Keep**
  - After skipping the specified number of DPRs, how many are to be kept?
  - Entered in the **Keep** field on the Production Request Editor.
  - The number to keep is usually one but could be any number.
- **Skip First**
  - Button on the Production Request Editor.
  - Selected to skip the first DPR.
  - Not selected if the first DPR is to be run.

The Planning Subsystem uses the preceding information to establish a pattern of execution. The pattern is effective for the single PR in which the “number to skip” and the “number to keep” are specified; it is not maintained between PRs.

The following example of the Intermittent Activation Production Rule is shown in Figure 10:

- The Production Planner prepares a production request for a 14-day period, generating 14 DPRs.
- The Production Planner made the following selections on the Production Request Editor:
  - Entered “4” in the **Number to Skip** field.
  - Entered “1” in the **Number to Keep** field.
  - Did **not** select the **Skip First** button.
- Consequently, the following results are obtained:
  - First DPR runs.
  - Four DPRs (second through fifth) are skipped.

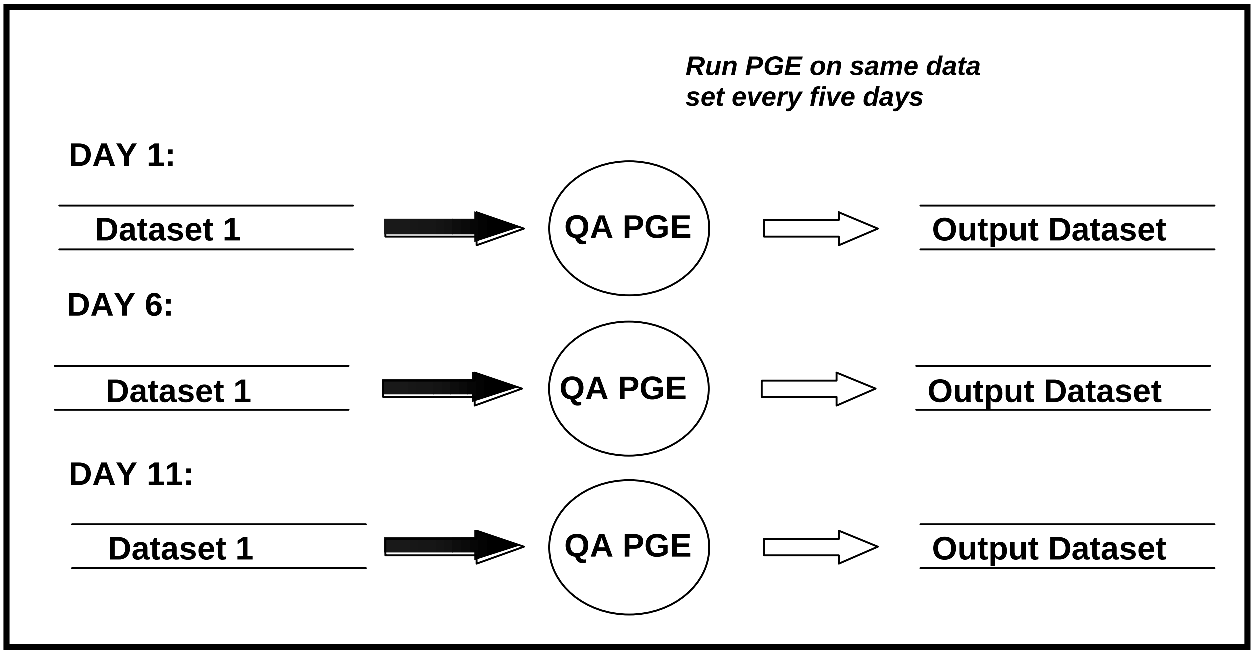

Figure 10. Example of the Intermittent Activation Production Rule

- Sixth DPR runs.
- Four DPRs (seventh through tenth) are skipped.
- Eleventh DPR runs.
- Remaining three DPRs (twelfth through fourteenth) are skipped.

Metadata Checks and Metadata Query Production Rules

The Metadata Checks and Metadata Query Production Rules are similar in definition and use. Both production rules allow the PGE to specify granule-level metadata values that define whether the PGE can accept one (or more) of its inputs. The rules differ only in the results of metadata search performed.

- Metadata Checks Production Rule.
  - When PLS requests the Science Data Server to search for the input(s), the Science Data Server "checks" the metadata of all granules that match the time frame with respect to the value(s) allowed by the PGE.
  - If any granule fails to match the specified value(s), the PGE is not executed.
- Metadata Query Production Rule.
  - When PLS requests the Science Data Server to search for the input(s), the Science Data Server adds to the query the metadata value(s) desired by the PGE.

- Only the granules that match the time frame of the PGE plus the granule-level metadata value(s) specified by the PGE are staged for the PGE to use as input.
- If no granules are found matching the conditions and the input is not optional, the PGE is not executed.

- Example of Metadata Checks:
  - A MODIS PGE is run when the Percent Cloud Cover of its inputs is greater than 25 percent.
  - The Metadata Checks Production Rule is used to specify the granule-level metadata value of greater than 25.
  - When the PGE is scheduled and is ready to start, two granules match the timeframe of the Production Request for the input with the Metadata Check.
  - If both granules have a Percent Cloud Cover greater than 25 percent, execution of the PGE starts and both granules are staged.
  - If one of the granules has a Percent Cloud Cover of 15 percent, the PGE is not executed.
- Example of Metadata Query:
  - A MODIS PGE is run when as many granules as possible of one of its inputs have a QA Value = "Good".
  - The Metadata Query Production Rule is used to specify the granule-level metadata value = "Good".
  - When the PGE is scheduled and is ready to start, two granules match the time frame of the production request for the input with the Metadata Query.
  - If both granules have a QA Value = "Good", execution of the PGE starts and both granules are staged.
  - If one of the granules has a QA Value = "Bad", the PGE executes but with only one granule (the one with QA Value = "Good").

The Metadata Checks and Metadata Query Production Rules are used in conjunction with the times specified in the Basic Temporal Production Rule or other production rules. The Metadata Check or Query is added information that further refines what granules are sought by the PGE.

Multi-Granule ESDTs are a special case of the Metadata Query Production Rule. Multi-Granule ESDTs are used for PGE inputs or outputs when more than one granule of the same ESDT exists for the same temporal range (time period). The Multi-Granule ESDT mechanism employs a metadata parameter to differentiate between the "equal in time" granules. A metadata parameter is selected that is unique across granules for the same time period and that is used by PDPS to keep track of which granule is which when the granules are produced. Later, if only one of a pair of granules for a particular time period is needed as input to the PGE, the Metadata Query is used to ensure that PDPS schedules the correct granule as input.

The **Data Day Production Rule** is actually an addition to the Metadata Query Production Rule involving runtime parameter values. There is a pair of settings (Start Data Day and End Data Day) that allow a PGE to perform a Metadata Query for the start of the Data Day and the end of the Data Day. A separate section of this lesson is devoted to the Data Day Production Rule.

Using runtime parameter values is a capability of the Metadata Query and Metadata Checks Production Rules. Rather than use a hard-coded value for the check or query, a value computed from one of the other production rules can be used.

Figure 11 illustrates the Metadata Checks and Metadata Query Production Rules. If no Metadata Check or Query were applicable, the PGE shown in the figure would use three granules of input (i.e., Granules A through C). However, let us assume that the metadata value to be checked/queried is %CloudCover. Each granule has a different value for %CloudCover.

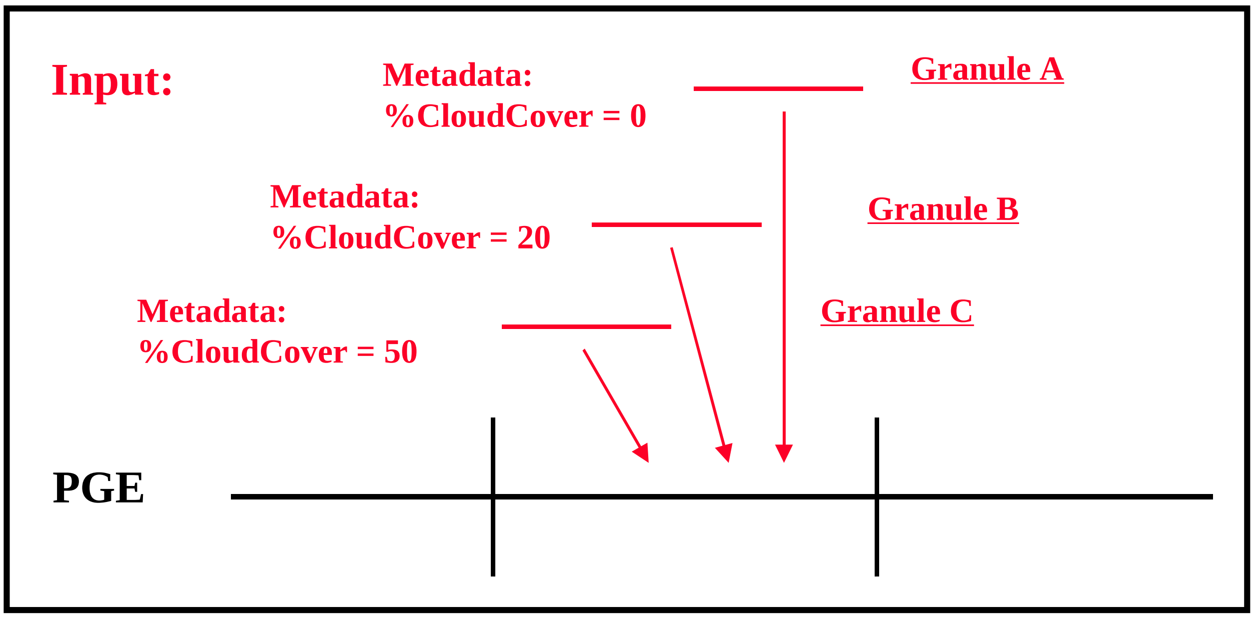

Figure 11. Example of the Metadata Checks and Query Production Rules

The following results demonstrate the differences between the Metadata Checks and Metadata Query Production Rules, especially with respect to the number of inputs that the PGE receives when different values are specified:

- Metadata Check of %CloudCover < 80:
  - In this case all three granules are acquired and the PGE is scheduled and executed.

- Metadata Query of %CloudCover < 80:
  - All three granules are acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 50:
  - The PGE is not scheduled because only one of the three granules (Granule C) meets the criterion.
- Metadata Query of %CloudCover = 50:
  - Granule C is found and if the PGE's Min/Max Granules parameters are set to allow one granule, that one granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover < 50:
  - The PGE is not scheduled because only two of the three granules (Granule A and B) meet the criterion.
- Metadata Query of %CloudCover < 50:
  - Granules A and B are found and if the PGE's Min/Max Granules parameters are set to allow two granules, the granules are acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover <= 50:
  - The PGE is scheduled and executed because all three granules meet the criterion.
- Metadata Query of %CloudCover <= 50:
  - All three granules are found and acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 20:
  - The PGE is not scheduled because only one of the three granules (Granule B) meets the criterion.
- Metadata Query of %CloudCover = 20:
  - Granule B is found and if the PGE's Min/Max Granules parameters are set to allow one granule, the granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover < 20:
  - The PGE is not scheduled because only one of the three granules (Granule A) meets the criterion.

- Metadata Query of %CloudCover < 20:
  - Granule C is found and if the PGE's Min/Max Granules parameters are set to allow one granule, the granule is acquired and the PGE is scheduled and executed.
- Metadata Check of %CloudCover = 10:
  - The PGE is not scheduled because none of the three granules meets the criterion.
- Metadata Query of %CloudCover = 10:
  - The PGE is not scheduled because no granules are returned from the query (unless Minimum Granules is set to 0).

Note that there can be more than one Metadata Check or Metadata Query on a given input. In the preceding example, a Metadata Check on %CloudCover can be combined with a Metadata Query on another parameter to further limit the input.

The Metadata Checks and Metadata Query Production Rules are additions to settings/syntax put into the ODL files for other production rules. The addition of a Metadata Check or a Metadata Query to an input means that other production rules used to evaluate that input will be applied in combination with the Metadata Check or Metadata Query.

PGE Science Metadata ODL File Parameters

Although the Metadata Checks and Metadata Query Production Rules are similar, there are two different ODL objects used to define them within a PCF_ENTRY in the PGE science metadata ODL file; i.e., the METADATA_CHECKS object and the METADATA_QUERY object.

The METADATA_CHECKS object has the following syntax:

```
OBJECT = PCF_ENTRY
   .
   .
   .
   .
   .
   OBJECT = METADATA_CHECKS
      .
      .
      .
   END_OBJECT = METADATA_CHECKS
END_OBJECT = PCF_ENTRY
```

The METADATA_QUERY object has the same syntax except "METADATA_QUERY" replaces "METADATA_CHECKS" in every instance.

Most of the following parameters must be set in the PGE science metadata ODL file within the METADATA_CHECKS or METADATA_QUERY ODL object (as applicable) in order to implement either the Metadata Checks or Metadata Query Production Rule:

- CLASS.
- PARM_NAME.
- OPERATOR.
- VALUE.
- DATABASE_QUERY.
- KEY_PARAMETER_NAME (optional).
- KEY_PARAMETER_VALUE (optional).

CLASS is a simple counter used to differentiate the different Metadata Checks or Metadata Query objects within the file. Since each Metadata Checks or Metadata Query object resides within a different PCF_ENTRY object, the CLASS for an METADATA_CHECKS or METADATA_QUERY object can always be 1 (e.g., CLASS = 1).

PARM_NAME is the name of the metadata parameter on which the check or query is to be performed. The value specified for PARM_NAME (e.g., PARM_NAME = "%CloudCover") must be part of the granule-level metadata of the ESDT. In addition, it must match the parameter name specified in the ESDT science metadata ODL file.

OPERATOR is the operator (e.g., OPERATOR = "==") on which the check/query is to be performed. The following values are valid for OPERATOR:

- ">"
  - Value in metadata must be greater than.
- "<"
  - Value in metadata must be less than.
- ">="
  - Value in metadata must be greater than or equal to.
- "<="
  - Value in metadata must be less than or equal to.
- "=="
  - Value in metadata must be equal to.
- "!="
  - Value in metadata must be **not** equal to.

VALUE is the value (e.g., VALUE = 50) against which the metadata parameter (defined by PARM_NAME) is compared (using the operator specified by the OPERATOR parameter). The value for the VALUE parameter should be the type of data (e.g., integer, string) as defined in the ESDT ODL metadata for the parameter.

DATABASE_QUERY indicates whether the value for the Metadata Check or Query should be retrieved from the PDPS database rather than through the use of the VALUE parameter. Specifying DATABASE_QUERY permits **runtime parameter values** to be used for Metadata Query or Metadata Checks. The following values are valid for the DATABASE_QUERY parameter:

- "NONE"
  - Use the value in the VALUE parameter; no value from the PDPS database is used.
- "PATH NUMBER"
  - Use the Path Number (0-233) of the orbit for which the PGE is scheduled.
- "ORBIT NUMBER"
  - Use the Orbit Number of the orbit for which the PGE is scheduled.
- "TILE ID"
  - Use the Tile ID of the current Data Processing Request.
- "START DATA DAY"
  - Use the Start Data Day for the current Data Processing Request.
- "END DATA DAY"
  - Use the End Data Day for the current Data Processing Request.

KEY_PARAMETER_NAME is an optional parameter that is used to specify the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_NAME (e.g., KEY_PARAMETER_NAME = "ParameterName" for metadata checks or queries within the MeasuredParameters group) in conjunction with the KEY_PARAMETER_VALUE allows PDPS to determine which container within the multi-container group is to be the object of the check or query. KEY_PARAMETER_NAME is **not** used for product-specific attributes.

KEY_PARAMETER_VALUE is an optional parameter that is used to specify the **value** (e.g., KEY_PARAMETER_VALUE = "LandCoverage") for the container within a multi-container metadata group (i.e. the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_VALUE in both the PGE science metadata ODL file and ESDT science metadata ODL file must match.

Multi-Granule ESDTs are created by adding the following parameter to the PCF_ENTRY in the PGE science metadata ODL file:

- DISTINCT_VALUE.

The DISTINCT_VALUE must be set to the value of the metadata parameter that is used to differentiate granules within the Multi-Granule ESDT. In addition, the input or output defined by the PCF entry must have a corresponding DISTINCT_PARAMETER entry in the ESDT science metadata ODL file.

ESDT Science Metadata ODL File Parameters

The METADATA_DEFINITION ODL object surrounds the definition for Metadata Checks or Metadata Query information within the ESDT science metadata ODL file. An OBJECT/END_OBJECT pair is needed to separate the parameters defining the Metadata Definition from the rest of the parameters defining the ESDT with the following syntax:

```
OBJECT = METADATA_DEFINITION
    .
    .
    .
END_OBJECT = METADATA_DEFINITION
```

A METADATA_DEFINITION object can match multiple Metadata Checks or Metadata Query objects in various PGE science metadata ODL files. There is no difference between the two production rules with respect to the parameters that need to be set in the ESDT science metadata ODL file. Most of the following parameters must be set:

- CLASS.
- PARM_NAME.
- CONTAINER_NAME.
- TYPE.
- KEY_PARAMETER_NAME (optional).
- KEY_PARAMETER_VALUE (optional).

CLASS is a simple counter used to differentiate the different Metadata Definition objects within the file. Each Metadata Definition object within the file must have a **different** CLASS value.

PARM_NAME is the name of the Metadata parameter on which the check or query will be performed. The value specified for PARM_NAME must be part of the granule-level metadata of the ESDT. It must also match the parameter name specified in the PGE science metadata ODL file(s).

CONTAINER_NAME is the name of the Metadata Group within which the metadata parameter defined by PARM_NAME is contained. For product-specific attributes CONTAINER_NAME is set to the string "AdditionalAttibutes" (i.e., CONTAINER_NAME = "AdditionalAttibutes").

TYPE indicates the type of data within the metadata parameter. The following values are valid for TYPE:

- "INT"
  - Integer data.
- "FLOAT"
  - Floating point data.
- "STR"
  - String or character data.
  - Note that dates and times are considered string data.

KEY_PARAMETER_NAME is an optional parameter that is used to specify the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_NAME allows PDPS to determine which container within the multi-container group is to be the object of the check or query.

KEY_PARAMETER_VALUE is an optional parameter that is used to specify the value for the container within a multi-container metadata group (i.e., the MeasuredParameters metadata group in most ESDTs). The KEY_PARAMETER_VALUE in both the ESDT science metadata ODL file and PGE science metadata ODL file must match.

The ESDT science metadata ODL file for an input specifying Multi-Granule ESDTs needs to have the following parameter added:

- DISTINCT_PARAMETER.

The DISTINCT_PARAMETER must be set to the name of the metadata parameter that is used to differentiate granules within the Multi-Granule ESDT. A corresponding METADATA_DEFINITION must be created to help PDPS find the specified metadata parameter when querying the Science Data Server.

Data Day Production Rule

The Data Day Production Rule is an addition to the Metadata Query Production Rule involving runtime parameter values. The Data Day Production Rule uses a query to the PDPS database for the time period for the DPR and a Metadata Query for data matching the Data Day. The Data Day is defined as a day within twelve hours of the current day. There is a pair of settings (Start Data Day and End Data Day) that provide parameters for the Metadata Query.

The Start Data Day and End Data Day values are calculated by subtracting twelve hours from the starting day for which the PGE is executing and adding twelve hours onto the ending day for which the PGE is running.

- Data Day for a PGE is running on data from 07/04 00:00:00 to 07/05 00:00:00 is defined as follows:
  - START_DATA_DAY = 07/03 12:00:00
  - END_DATA_DAY = 07/06 12:00:00.

Spatial Query Production Rule

The Spatial Query Production Rule allows a PGE to select input(s) based on the spatial coverage of another input (called the **key input**). The PDPS queries the Science Data Server for the spatial coverage of the key input, then uses it in acquiring any subsequent inputs that the PGE has requested that have the same spatial coverage.

- Example:
  - Level 0 input data for an ASTER DPR covers a small section of the Earth.
  - The PGE requires ancillary data that covers the same area to complete its processing.
  - The PGE uses the Spatial Query Production Rule to mark the geographic input as its key input.
  - The PGE specifies that the ancillary input is to be retrieved for the same spatial coverage as that of the key input.
  - When PDPS finds an input granule for the PGE, it performs a Spatial Query to acquire the ancillary input with the same spatial coverage as that of the key input.

Without specifying coordinates, PDPS can match inputs against the spatial constraint of the key input, and give to a PGE only those granules, which overlap in area.

For Release 5B Spatial Pad will be added to the Spatial Query Production Rule. Spatial Pad is a means of padding the spatial constraints of the key input. The specified pad is added to all sides of the key input's spatial shape. All granules that intersect the expanded area are retrieved.

Figure 12 is an illustration of the Spatial Query Production Rule. The figure shows a PGE that has two input types, one of which is the key input. The other type of input has granules labeled with the names of various colors. One granule (i.e., “green”) of the key input is found. The spatial coordinates of the granule are retrieved and all inputs of the second ESDT are checked for overlap with the key input’s coordinates.

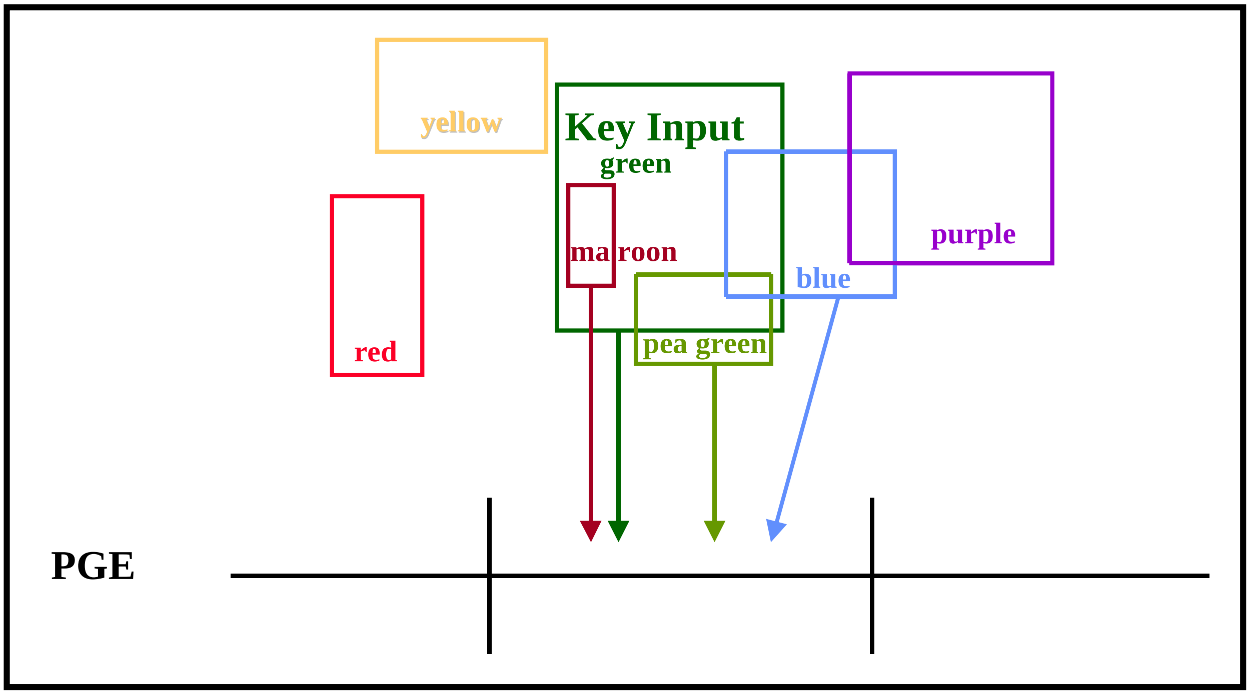

Figure 12. Example of the Spatial Query Production Rule

Assuming that all granules relate to the same time period, the granules are evaluated as follows:

- The “yellow” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input.
- The “red” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input.
- The “blue” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. Part of its spatial constraint is within the constraint of the key input.
- The “maroon” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. The spatial constraint of this granule is completely within the constraint of the key input.
- The “pea green” granule is retrieved as an input because its spatial coordinates overlap with those of the key input. Part of its spatial constraint overlaps with that of the key input.
- The “purple” granule is not retrieved as an input because its spatial coordinates do not overlap with those of the key input. It does not matter that it overlaps with another input that is accepted (i.e., the “blue” granule).

The Spatial Query Production rule is somewhat of an addition to other production rules. As such, it needs the same parameter settings as the Basic Temporal Production Rule. The values specified in the Basic Temporal Production Rule (or other production rules) are set first, then the Spatial Query Production Rule syntax is added.

PGE Science Metadata ODL File Parameters

In order to implement the Spatial Query Production Rule the following two parameters must be defined in the applicable PCF_ENTRY (each input is defined by a separate PCF_ENTRY in the PGE science metadata ODL file):

- KEY _INPUT.
- QUERY_TYPE.

The entries are made in the following format:

```
OBJECT = PCF_ENTRY
   .
   .
   .
   QUERY_TYPE = “Spatial”
   KEY_INPUT = “Y”
   .
   .
   .
END_OBJECT = PCF_ENTRY
```

QUERY_TYPE indicates what type of query is to be done to acquire the input defined by the PCF_ENTRY object. Valid values are as follows:

- "Temporal" - Input is acquired based on time.
  - The Basic Temporal and/or the Advanced Temporal Production Rules is/are used to get the input.
  - “Temporal” is the value that is assumed if the parameter is left out of the PCF_ENTRY object.
- "Spatial" - Input is acquired based on spatial coordinates (as well as time).
  - An input must be designated the key input to be used in determining the spatial constraints of the search.
  - “Spatial” is the value specified for each input that uses the Spatial Query Production Rule.
- "Tile" - Input is acquired by the spatial definition of a tile.
  - Refer to the Tiling Production Rule for additional information.

- "Already Created Tile" - Input is acquired based on the tile ID of an already created tile.
  - Refer to the Tiling Production Rule for additional information.

The KEY_INPUT is the input on which the spatial queries for other inputs will be based. When a KEY_INPUT parameter is assigned a value of "Y" the corresponding input is designated a key input and is treated as such. A value of "N" or leaving out the parameter entirely specifies a non-key input. Only one (1) key input is allowed per PGE Profile.

Tiling Production Rule

The Tiling Production Rule allows a PGE to run over a series of specific geographic locations called "tiles". The tiles are defined before the PGE is scheduled, specifying the longitude and latitude of four points that outline each tile. When the PGE is scheduled, it is scheduled for an entire day, and data is queried based on both a timeframe and the geographic location specified. Each run of the PGE for that day is for a specific tile, and only data that overlap or fit within the geographical coordinates of the tile are staged for the PGE.

- Example:
  - A MODIS PGE is designed to run on data for a specific geographic location every day.
  - The location is expressed as a polygon defined by latitude and longitude coordinates.
  - The MODIS PGE is scheduled every day, and data are retrieved that match the time period (the day for which the PGE is being executed) and some part of it falls within the geographic constraints of the tile.
  - The PGE runs and produces data that define information about the particular tile.

Period and **boundary** are used to specify the timing of input data and provide indications of how often the PGE should be executed. But at least some of the input data are retrieved on the basis of the coordinates defined for the tile on which the PGE is executing. In fact there are really two kinds of tiling:

- The PGE takes in data based on geographic shapes (tiles) and produces an output or outputs for the specified geographical coverage.
- The PGE takes in an already tiled product as input.
  - This form of tiling is more like a Metadata Query using a runtime parameter value to acquire the correct tiled data.

There are some possible future enhancements to the Tiling Production Rule but they have not been scheduled yet:

- **Zonal Tiling** supports tiles that cover a band around the Earth between two given latitudes.
- **Tile Clustering** involves grouping tiles that cover nearby geographic locations together so that data that span the tiles may be staged only once.
  - Intended to improve the performance of Tiling.
  - Also provides for the ability to prioritize one group of tiles over others (so specific geographic outputs are produced before other geographic outputs).

Runtime parameters can be set to the ID of the tile being processed. Since PDPS schedules a Tiling PGE to run once per tile, it can pass the identifier of the tile to the PGE. The identifier can be placed under a specified runtime parameter in the PCF, or it can be used in a Metadata Query for a PGE that would use already tiled data as input.

Figure 13 provides an example of the Tiling Production Rule. The PGE runs once per defined tile. So for every tile in the Tile Scheme a Data Processing Request is created to run using data that match the geographic extent of the tile. The PDPS sends the coordinates of the tiles (e.g., Tiles 1 through 3 in Figure 13) to the Science Data Server when requesting data and acquires only the granules that fall fully or partially within the defined tile.

The PGE itself must be set up to handle the fact that the entire area of the tile may not be covered by available data. In addition, because PDPS does not keep track of tiles once they have been produced, the PGE must set the metadata of the output products so a downstream Tiling PGE can acquire the correct granules for a given tile. The PDPS matches up the granules needed for a downstream PGE via a query to the Data Server Subsystem.

Tiling Based on Already Tiled Data

As previously stated the second form of Tiling concerns PGEs based on tiles that have already been created by other PGEs. Tiling based on already tiled data is really a combination of the Metadata Query Production Rule and the Tiling Production Rule. The latter is used in running the PGE(s) once per tile, just like any other Tiling PGE. The Metadata Query Production Rule is used in acquiring the previously tiled data by querying the Science Data Server for metadata that match the tile ID that is currently being executed. The query depends on the “runtime parameters” function of Tiling to provide the tile ID relevant to the PGE that is currently being executed.

The Tiling Production Rule is based (at least for the PGE science metadata ODL file) on the same fields used for the Basic Temporal Production Rule. A PGE that performs Tiling still needs a **boundary** and **period** and other such parameters. The difference is that values specified for some of the fields provide Tiling information. Furthermore, Tiling requires that a tile scheme be identified in the PGE science metadata ODL file. The tile scheme is defined in a tile science metadata ODL file.

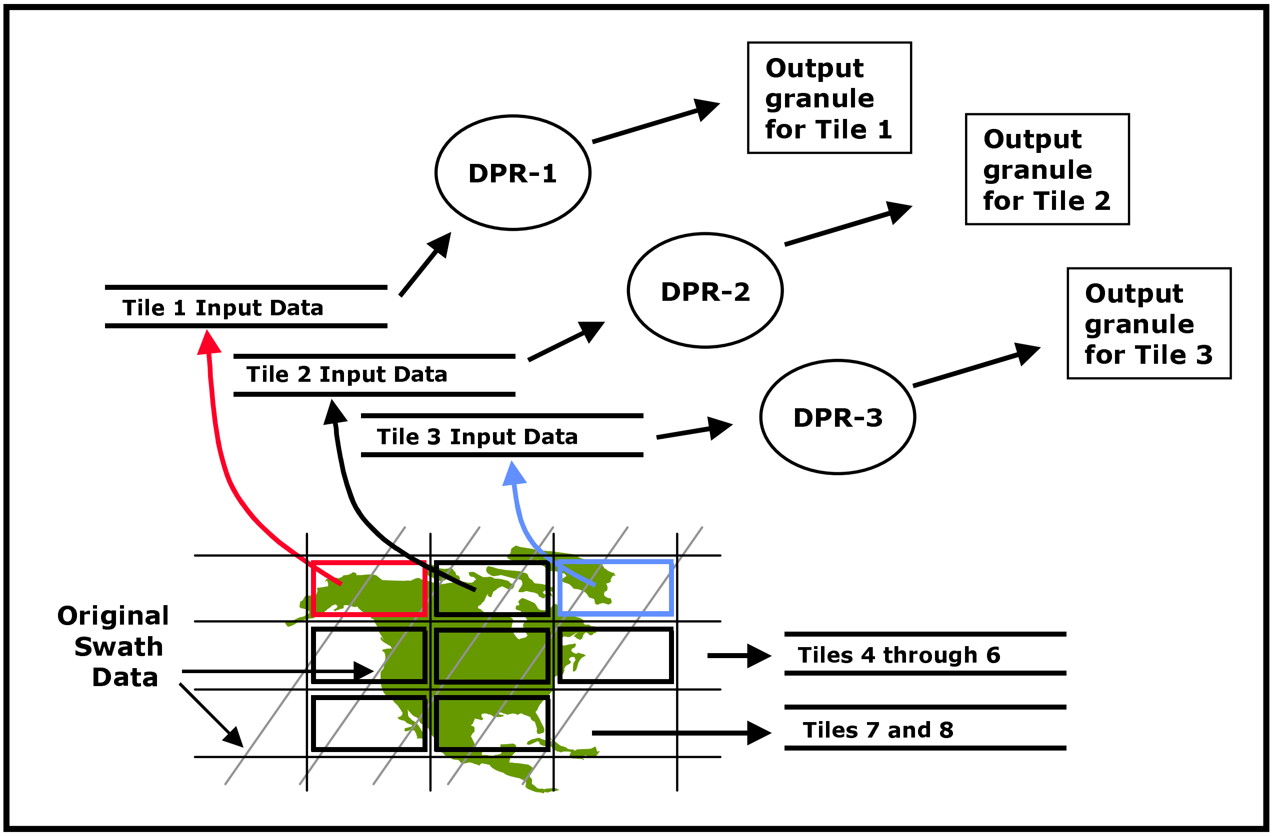

Figure 13. Example of the Tiling Production Rule

PGE Science Metadata ODL File Parameters

The following parameters must be set in the PGE science metadata ODL file in order to implement the Tiling Production Rule:

- SCHEDULE_TYPE.
- TILE_SCHEME_NAME.

In addition, the following parameter is used within a PCF_ENTRY when defining the Tiling Production Rule:

- QUERY_TYPE.

The SCHEDULE_TYPE parameter defines the type of scheduling that will be done for the PGE. Values for the Tiling Production Rule are:

- "Tiling"
  - Tile-Scheduled.
  - The PGE is scheduled based on the specified PROCESSING_PERIOD and PROCESSING_BOUNDARY, but a DPR is created for each defined tile.

The TILE_SCHEME_NAME parameter is the name of the Tile Scheme to be used by PDPS when scheduling and executing PGEs for each defined tile. There must be a tile ODL file that matches the specified scheme name.

The QUERY_TYPE parameter specifies the type of query to be performed on the input defined by the PCF_ENTRY Object. It uses the following syntax:

```
OBJECT = PCF_ENTRY
    .
    .
    .
    QUERY_TYPE =
    .
END_OBJECT = PCF_ENTRY
```

For Tiling PGEs there are two possible values for QUERY_TYPE:

- "Tile"
    - The data for the input are acquired on the basis of the spatial constraints of the current tile.
    - Used for a PGE that takes in raw data and produces one or more tiles of data.
- "Already Created Tile"
    - The input is a tiled output of another Tiling PGE.
    - Used for a PGE that takes input from one or more other Tiling PGEs.
    - A Metadata Query must be added to this PCF_ENTRY in order for the correct tiled input to be acquired.

Tile Science Metadata ODL File Parameters

The following parameter must be set in the Tile science metadata ODL file in order to implement the Tiling Production Rule:

- TILE_SCHEME_NAME.

In addition, the following ODL objects are used within a PCF_ENTRY to define the Tiling Production Rule:

- TILE object.
- TILE_COORDINATE object.

The TILE_SCHEME_NAME parameter identifies the tile scheme for which the tile information is being specified. Values are limited by the following constraints:

- The string specified can be no more than 20 characters.

- The string specified should match the string specified for TILE_SCHEME in the PGE science metadata ODL file.

The TILE object is an ODL object that surrounds each tile definition. An OBJECT/END_OBJECT pair (as shown in the example that follows) is needed for each tile that is going to be expressly defined:

```
OBJECT = TILE
    .
    .
    .
END_OBJECT = TILE
```

The following parameters are set in the TILE object in order to implement the Tiling Production Rule:

- CLASS.
- TILE_ID.
- TILE_DESCRIPTION.

CLASS is a simple counter used to differentiate the different TILE objects within the file. Each TILE object needs to have a different CLASS value.

TILE_ID is the tile identifier for the tile being defined. The TILE_ID must be an integer (e.g., TILE_ID = 12) and must be greater than zero but less than the maximum integer. If a Tile ID is defined in other tile schemes, it must have the same coordinates and description.

TILE_DESCRIPTION is a string of characters (255 characters maximum) that describes what the tile is for, such as its geographic location or area that it covers (e.g., TILE_DESCRIPTION = "Upper North America").

The TILE_COORDINATE object is an ODL object that defines a coordinate (latitude and longitude) for a tile. An OBJECT/END_OBJECT pair is needed for each coordinate that is defined. Each tile must have four TILE_COORDINATE objects defined. (Currently only four-sized polygons are allowed; however, a possible future enhancement would provide for polygons with more than four points.) Coordinate objects must follow a clockwise sequence so that if lines were drawn between the points in the order they are given the desired shape would be drawn.

Coordinate objects conform to the following format:

```
OBJECT = TILE
    .
    .
    .
    OBJECT = TILE_COORDINATE
        CLASS =
```

```
        LATITUDE =
        LONGITUDE =
      END_OBJECT = TILE_COORDINATE
      .
      .
      .
    END_OBJECT = TILE
```

The following parameters are set in the TILE_COORDINATE object in order to implement the Tiling Production Rule:

- CLASS.
- LATITUDE.
- LONGITUDE.

The CLASS parameter (e.g., CLASS = 1) is an object counter that is used only to distinguish objects. The value assigned to CLASS must be an integer greater than zero and must be unique in the file for the particular type of object.

The LATITUDE parameter (e.g., LATITUDE = 12.15) describes the latitude component of the tile coordinate. There is one LATITUDE entry per TILE_COORDINATE object.

The LONGITUDE parameter (e.g., LONGITUDE = -43.22) describes the longitude component of the tile coordinate. There is one LONGITUDE entry per TILE_COORDINATE object.

Closest Granule Production Rule

The Closest Granule Production Rule allows a PGE to request the nearest input granule from the Data Processing Request time. The PDPS requests a search forward or backward for a specified period of time until it finds a granule that matches the request. However, there is a limit to the number of queries that are performed. The number of queries and the period length of the query are specified during SSI&T.

- Example:
  - A PGE processes data at daily intervals and could use a particular type of calibration granule that would allow it to determine the nearest parameters of the instrument.
  - Although most calibration coefficients are defined as static granules, in this case there is a dynamic granule that is received about once a month.
  - The closest such granule would be optimum, so the PGE uses the Closest Granule Production Rule to search forward or backward from the time of the DPR to find the nearest calibration granule.

The Closest Granule Production Rule supersedes the Most Recent Granule Production Rule. The latter allowed the search for inputs to go backward in time from the start of the DPR. The Closest Granule Production Rule allows the search for input granules to go either backward or forward in time, increasing the flexibility of the rule. The Closest Granule Production Rule has all of the ability of Most Recent Granule, plus the ability to search forward in time for input data.

The Closest Granule Production Rule uses two values to determine the period of the query. The two values are concerned with the direction of the query and the number of queries allowed.

- Offset.
  - Tells the PDPS software the query duration.
  - The sign (+ or -) indicates whether the query goes forward (positive) or backward (negative) in time.
- Retries.
  - Tells the PDPS software how many time periods (as defined by the Offset) to search (either forward or backward in time) for a matching granule.

The PDPS does a Basic Temporal query before using Closest Granule to find the input. If the desired input is not found within the time period of the DPR, PDPS performs a query against the Science Data Server for the period defined by the offset. Again, if no matching granule is found, PDPS repeats the query, going backward or forward in time by the value specified in the offset. If no acceptable granule has been found before the maximum number of queries is reached, PDPS fails to generate the DPR due to insufficient input data.

Figure 14 illustrates the Closest Granule Production Rule. In the example, the PGE has a boundary of “start of day” and a period of one hour, so it is scheduled to run for one hour’s worth of input data. The input has a period of one hour, and can come in at any hour of the day. Consequently, the PGE requests one granule of input.

The PGE has defined the Closest Granule Production rule with a –6-hour period of the query, meaning that it queries back in time in six-hour intervals. The number of retries is two. The PDPS performs a query for the input based on the time period of the DPR. Not finding any matching data, it uses the Closest Granule information to query for a six-hour period beginning six hours before the start time of the DPR. Again nothing is found, so a second Closest Granule query is performed, this one six hours before the last Closest Granule query. The second query results in the discovery of two matching granules. The PDPS selects the granule that is later in time and schedules the PGE to use it as input.

If the Closest Granule Production Rule were used in conjunction with the Minimum/Maximum Number of Granules Production Rule, it might be possible for both granules to be selected in the previously described Closest Granule query. If the example included setting the Maximum Number of Granules to two, both granules would be selected as input to the PGE.

The Closest Granule Production Rule needs the same parameter settings as the Basic Temporal Production Rule. The values needed for the Basic Temporal Production Rule must be set before the Closest Granule Production Rule syntax is added.

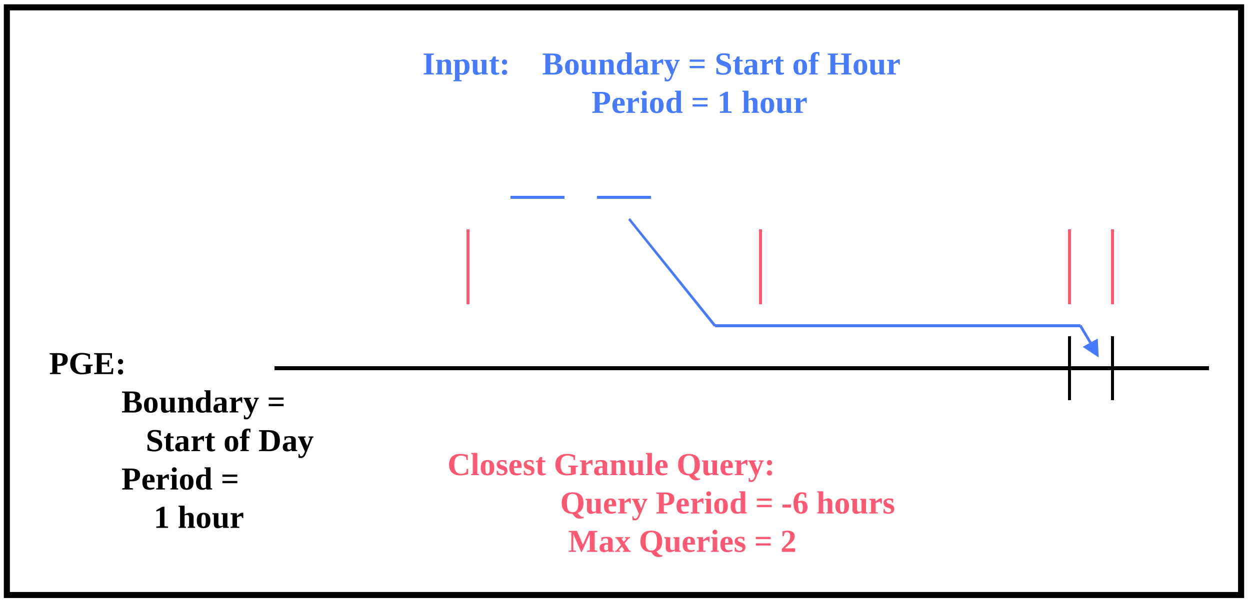

Figure 14. Example of Closest Granule Production Rule

PGE Science Metadata ODL File Parameters

In addition to the parameter settings for the Basic Temporal Production Rule, the following parameters must be set within the appropriate PCF_ENTRY in the PGE science metadata ODL file in order to implement the Closest Granule Production Rule:

- CLOSEST_QUERY_OFFSET.
- CLOSEST_QUERY_RETRIES.

CLOSEST_QUERY_OFFSET is the offset added to or subtracted from the Data Start Time of the DPR and uses as the query for the requested input data type. The specified value has the format "<Period Type>)=<Length of Period>" (e.g., CLOSEST_QUERY_OFFSET = “HOURS=6”). The following “Period Type” values are used in implementing the Closest Granule rule:

- "WEEKS"
  - Offset is some number of weeks.
  - For example, "WEEKS=2" would be a 14-day offset.
- "DAYS"
  - Offset is some number of days.
  - For example, "DAYS=5" would be a 120-hour offset.

- "HOURS"
  - Offset is some number of hours.
  - For example, "HOURS=4" would be a 240-minute offset.
- "MINS"
  - Offset is some number of minutes.
  - For example, "MINS=5" would be a 300-second offset.
- "SECS"
  - Offset is some number of seconds.

CLOSEST_QUERY_RETRIES is the maximum number of Closest Granule queries before the DPR fails due to insufficient input data. The specified value is an integer value that is limited only by the maximum size of an integer on the executing hardware.

Note that the longer the offset value or the greater the number of retries, the more time that each query requires due to search time at the Science Data Server and processing time of any granules returned. The combination of a large offset with a large number of retries can (if no data granules are found) consume a lot of time while failing to generate a DPR.

Orbital Processing Production Rule

The Orbital Processing Production Rule is similar to the Basic Temporal Production Rule in that both define the time period for the inputs and outputs of the PGE. The difference is that the Orbital Processing Production Rule uses the orbit of the spacecraft to determine that time period. A PGE that processes data related to every orbit of a satellite uses data related to a time period that is computed from the orbit of that satellite.

- Example:
  - A PGE processes Level 0 data related to each orbit of the Terra satellite.
  - The Terra satellite has an orbital period of 98 minutes so the PGE is scheduled to process data for each 98-minute interval.
  - Since Level 0 data are received every two hours, the data staged for the PGE include every Level 0 granule that falls within the 98-minute PGE interval.
  - Only one granule of Level 0 data is relevant to some 98-minute orbits.
  - Two granules of Level 0 data are relevant to other 98-minute orbits.

The Orbital Processing Production Rule uses the “period” and “boundary” concept just like the Basic Temporal Production Rule. The difference is that for Orbital Processing, the orbit of the spacecraft is taken into account when a PGE or its data are marked as **orbit scheduled**.

When responding to a Production Request for orbit-scheduled processing, PDPS determines the orbit of the satellite via information provided during the SSI&T process. The information (stored in the PDPS database) gives the start time and length of a particular orbit or set of orbits. PDPS extrapolates (or interpolates in the case of an orbit between two orbital periods stored in the database) the start and end times of the PGE that is specified in the Production Request. Data are sought on the basis of the derived start and stop times and the appropriate data granule(s) is/are staged before the PGE is executed.

Orbital path is the path of the satellite over the Earth. It is a number from 0-233 that indicates the region of the Earth covered by a particular orbit. Note that because of the implementation of Orbital Path, there needs to be a mapping between the orbital path calculated by PDPS and the orbital path number expected by the PGEs.

Runtime parameters can be set to values associated with Orbital Processing. The following list of orbital parameters can be placed under runtime parameters:

- Orbit Number.
  - The number of the orbit (starting from zero) and continually increasing.
- Orbital Path Number.
  - The number of the path that maps to the orbit number.
  - The orbital path number is the 0-233 orbital path traversed by the satellite.
- Orbit Number within the Day.
  - The number of the orbit within the given day.
  - It includes any orbit that starts within the given day.
  - This is a **Release 5B** capability.
- Granule Number within the Orbit.
  - The number of the granule within a given orbit.
  - It includes any granule that starts within the given orbit.
  - This is a **Release 5B** capability.

Figure 15 provides an illustration of the Orbital Processing Production Rule. The PGE in the diagram takes a two-hour input, but is scheduled based on the orbit time and period of the satellite. PDPS uses the data collected at SSI&T to predict the time of the orbit and performs the query to the Science Data Server for the input based on that extrapolated or interpolated orbital time. Granules of input data are allocated to DPRs based on their ability to cover the time period relevant to the DPR.

In the example shown in Figure 15 the length of an orbit is less than the period of the two-hour input, so sometimes a single granule may cover the input time range of a PGE execution and at other times two granules are required. The production rule would work equally well if the data were of a shorter period (e.g., 1/2 hour) than the orbit of a satellite (e.g., 90 minutes). In such a case three granules would be staged for every execution of the PGE.

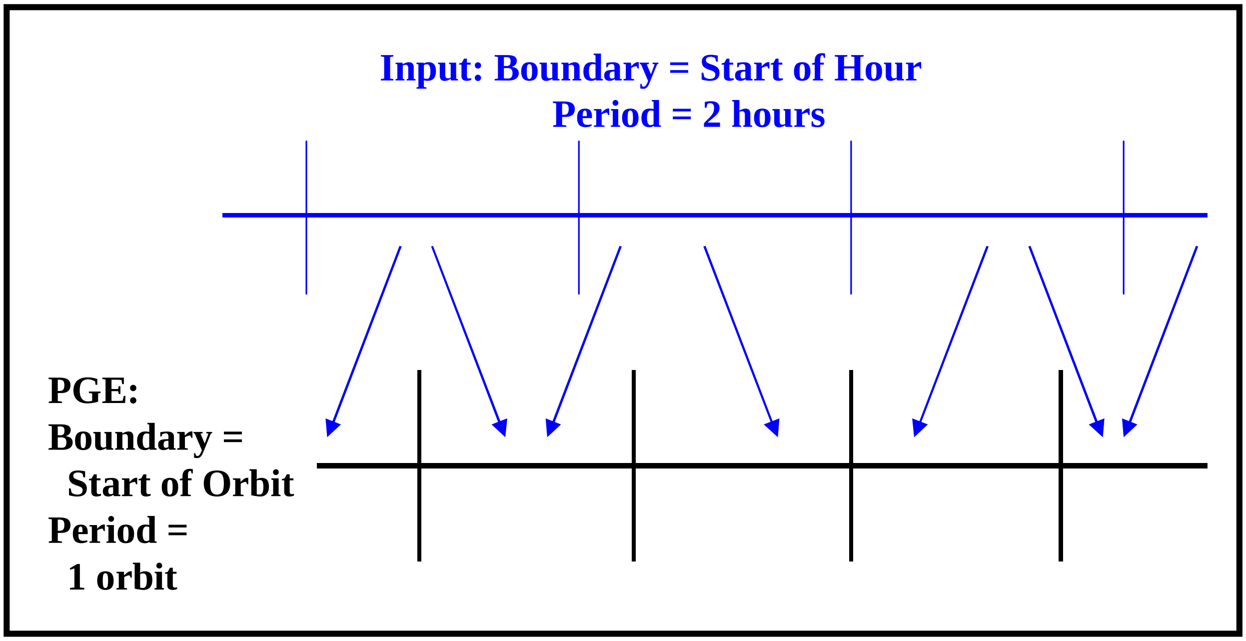

Figure 15. Example of the Orbital Processing Production Rule

The Orbital Processing Production Rule is based (at least for the PGE science metadata ODL file) on the same fields used for the Basic Temporal Production Rule. However, the values specified for the parameters provide orbit information rather than time-period information.

PGE Science Metadata ODL File Parameters

The following parameters must be set in the PGE science metadata ODL file in order to implement the Orbital Processing Production Rule:

- PLATFORM.
- SCHEDULE_TYPE.
- PROCESSING_PERIOD.
- PROCESSING_BOUNDARY.

The PLATFORM parameter is the name of the platform (satellite) for which the PGE is processing data. Information concerning the orbits of a satellite is stored in the PDPS database. Values that can be assigned to the parameter are subject to the following constraints:

- The string specified can have no more than 25 characters.
- The string specified should match the string specified in the orbit science metadata ODL file. If no matching file is found, an error is reported during SSI&T.

The SCHEDULE_TYPE parameter describes the type of scheduling that is required for the PGE. "Orbit" is the value used for Orbital Processing. As a result, the PGE is scheduled based on the start time and period of the satellite's orbit. Note that PROCESSING_PERIOD and PROCESSING_BOUNDARY must be set correspondingly.

The PROCESSING_PERIOD is the time interval for the data that the PGE processes. Assuming no combination of production rules that would affect the period, data are acquired for the specified PROCESSING_PERIOD and output data are planned for the given period. The value assigned to PROCESSING_PERIOD is of the format "<Period Type>=<Length of Period>". The “Period Type” applicable to the Orbital Processing Production Rule is "ORBITS". For example, "ORBITS=1" would be applied to a PGE that processes data related to one orbit’s worth of data.

The PROCESSING_BOUNDARY is the boundary (starting point in time) of the PGE. It specifies when each instance of the PGE should start. Note that the PROCESSING_BOUNDARY and PROCESSING_PERIOD are used in conjunction when scheduling the PGE. Consequently, "START_OF_ORBIT" is the acceptable PROCESSING_BOUNDARY for the Orbital Processing Production Rule. It indicates that the PGE processes data related to each satellite orbit. It must be used in conjunction with a PROCESSING_PERIOD that specifies a “Period Type” of “ORBITS”.

Orbit Science Metadata ODL File Parameters

The following parameter must be set in the orbit science metadata ODL file in order to implement the Orbital Processing Production Rule:

- PLATFORM.

In addition, the following ODL object is used in defining orbits for the Orbital Processing Production Rule:

- ORBIT_MODEL object.

The value assigned to the PLATFORM parameter in the orbit science metadata ODL file must be exactly the same as that specified for the same parameter in the PGE science metadata ODL file.

The ORBIT_MODEL object is an ODL object that surrounds each orbit definition. An OBJECT/END_OBJECT pair (as shown in the example that follows) is needed for each orbit that is to be expressly defined. PDPS extrapolates or interpolates orbits that are not specifically defined within the file.

```
OBJECT = ORBIT_MODEL
   CLASS = 1
   ORBIT_NUMBER = 1000
   ORBIT_PATH_NUMBER = 68
   ORBIT_PERIOD = "MINS=98"
   ORBIT_ START = “09/21/1999 14:50:00”
END_OBJECT = ORBIT_MODEL
```

The following parameters are set in the ORBIT_MODEL object in order to implement the Orbital Processing Production Rule:

- CLASS.
- ORBIT_NUMBER.
- ORBIT_PATH_NUMBER.
- ORBIT_PERIOD.
- ORBIT_START.

CLASS is a simple counter used to differentiate the different ORBIT_MODEL objects within the file. Each ORBIT_MODEL object needs to have a different CLASS value.

ORBIT_NUMBER is simply the number of the orbit being specified. Each orbit of the satellite has a sequential number associated with it. This is the integer value of the orbit number for the orbit being defined in the ORBIT_MODEL object.

ORBIT_PATH_NUMBER is value of the path for the specified orbit. The orbital path is a number from 0-233 that repeats every 16 days. This is the integer value of the orbital path number for the orbit being defined in the ORBIT_MODEL object.

ORBIT_PERIOD is the length of time it takes for the satellite to complete one orbit. The value assigned to ORBIT_PERIOD has the format "<Period Type>=<Length of Period>" (e.g., “MINS=98”). Note that the “Length of Period” is specified as a positive integer only.

Period Type values for the orbit model science metadata OFL file are:

- "WEEKS"
  - Orbit spans some number of weeks.
  - For example, "WEEKS=2" would be an orbit that takes two weeks to complete.
- "DAYS"
  - Orbit spans some number of days.
  - For example, "DAYS=5" would be an orbit that takes five days to complete.
- "HOURS"
  - Orbit spans some number of hours.
  - For example, "HOURS=4" would be an orbit that takes four hours to complete.
- "MINS"
  - Orbit spans some number of minutes.
  - For example, "MINS=85" would be an orbit that takes eighty-five minutes to complete.

- "SECS"
    - Orbit spans some number of seconds.
    - For example, "SECS=7200" would be an orbit that takes 7200 seconds (two hours) to complete.

ORBIT_START is the start date and time for the orbit defined by the particular ORBIT_MODEL object. Its format is either "MMM DD YYYY HH:MM:SS" or “MM/DD/YYYY HH:MM:SS”.

Production Planning Considerations

During normal operations it is expected that the Production Planner will not have to add PRs to the PDPS database very frequently. The frequency of this activity is, to some extent, determined by the SCF responsible for the science software.

- The PR is a template request to generate a particular data product and results in a production run of the associated SCF-provided PGE.
    - PR specifies a range (time, snapshot, data, tile, or orbit) over which the data products are to be produced or the PGEs are to be scheduled.
        - PR might request that the data product be produced for only a single day’s data.
        - PR might request that data products be produced for every opportunity of input data for several months, resulting in several hundred jobs being planned and run as the input data become available.
    - Early in a mission the SCF may prefer to request processing for a short time period only (e.g., a week or less).
        - At that time the SCF is gaining an understanding of the on-orbit behavior of the instrument, the resulting data, and the interaction of the science processing software with real data.
        - SCF reviews the quality of the products and notifies the Production Planner of the need for any changes to the PR (e.g., discontinue the PR, change time ranges, or modify input parameters).
    - When the SCF has developed a good understanding of the instrument’s behavior, the team may be comfortable requesting processing for months at a time.
    - DAAC operations may have operational reasons for wanting to issue processing requests for a more limited time period.
- The Production Planner has to balance the various considerations when determining whether or not to create or update a PR.

Planning decisions are made on the basis of locally defined planning strategies for supporting the SCFs' data processing needs. The production planning tools are intended to be flexible enough in their design to support the particular planning and scheduling cycles of the operations organization at each DAAC.

Before planning production the Production Planner must coordinate with the Resource Planner to resolve all resource allocation issues. The Resource Planner notifies the Production Planner of the resources available for use in processing. Furthermore, the Production Planner may well have direct access to the Resource Plan.

The Production Planner prepares monthly and weekly production plans. In addition, the Production Planner develops a daily production schedule from the most current weekly plan. However, the first step in the planning process is creating production requests using the Production Request Editor.

DPREP Considerations

DPREP (data preprocessing) is a set of three PGEs that are supplied by ECS, unlike most PGEs, which are provided by the Science Computing Facilities that ECS supports. DPREP consists of the following three PGEs:

- EcDpPrAm1EdosEphAttDPREP_PGE (Step 1).
- EcDpPrAm1FddAttitudeDPREP_PGE (Step 2).
- EcDpPrAm1FddEphemerisDPREP_PGE (Step 3).

The PGEs run separately and in a particular sequence.

Two files describe the PGEs and how to run them:

- "DPREP_README"
- "HowtoRunDPREP"

The files are installed on the science processor hosts (e.g., e0spg01, g0spg01, l0spg01, n0spg03) in the /usr/ecs/*MODE*/CUSTOM/data/DPS directory.

The DPREP PGEs process Level Zero (L0) Terra (AM-1) spacecraft data (e.g., ESDT AM1ANC) provided by EDOS. The output files/granules of the DPREP PGEs are subsequently used in the processing of data from various instruments on the satellite. They provide the following types of ancillary (non-science) data:

- Ephemeris
  - Spacecraft location: ephemeris (or orbit) data include: latitude, longitude, and height.
- Attitude
  - Orientation of the satellite, including yaw, pitch, and roll angles; and angular rates about three axes.

There are two profiles for DPREP PGEs:

- Profile 1 runs routinely at the DAACs using previous DPREP output in addition to new Terra ancillary (e.g., AM1ANC) data.
- Profile 2 (the boot-up procedure) takes in the Terra ancillary data only and is run under two sets of conditions:
  - First run of DPREP (because there is no previous output) to initialize DPREP processing.
  - Following any long period of time during which EDOS L0 ancillary data are unavailable. (Short gaps in the ephemeris data are filled by EcDpPrAm1EdosEphemerisRepair, one of the executables in the EcDpPrAm1EdosEphAttDPREP_PGE.)

In order to run Profile 2 successfully following a long period of data unavailability, DPREP must be told where to resume orbit counting. The initial orbit number in the Step 1 process control file (PCF), must be set to the orbit number corresponding to the timestamp at which data availability resumes.

Until an automated process can be implemented, whenever there is a telemetry drop-out, a member of the DAAC science support team takes the following actions:

- Calls the Flight Operations Team (FOT).
- Asks for the on-line engineer.
- Requests the orbit number that coincides with the start time of the first L0 ancillary data set that follows the data drop-out.
- Sets the orbit number in the Step 1 PCF.

Then Profile 2 can be run successfully. Afterward, routine operations can be resumed using Profile 1 PGEs.

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Launching the Production Request Editor

Launching the Production Request Editor

The following software applications are associated with the Production Request Editor:

- Production Request Editor.
- Subscription Editor.
- Subscription Manager.

Access to the Production Planning and Processing tools is gained through the use of UNIX commands.

Launching Production Request Editor applications starts with the assumption that the applicable servers are running and the Production Planner has logged in to the ECS system.

Launching the Production Request Editor

NOTE: Commands in Steps 1 through 9 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY** ***clientname*****:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Planning/Management Workstation by typing **/tools/bin/ssh** ***hostname*** (e.g., **e0pls03**, **g0pls01**, **l0pls02**, or **n0pls02**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).

- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.

- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g., cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

8 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the production planning startup scripts (e.g., EcPlPRE_IFStart).

- The ***MODE*** will most likely be one of the following operating modes:
  - OPS (for normal operation).
  - TS1 (for Science Software Integration and Test (SSI&T)).
  - TS2 (new version checkout).

- Note that the separate subdirectories under /usr/ecs apply to (describe) different operating modes.

9 Type **EcPlPRE_IFStart *MODE*** then press **Return/Enter** to launch the **Production Request Editor** GUI.

- The **Production Request Editor** graphical user interface (GUI) introductory window (Figure 16) is displayed.

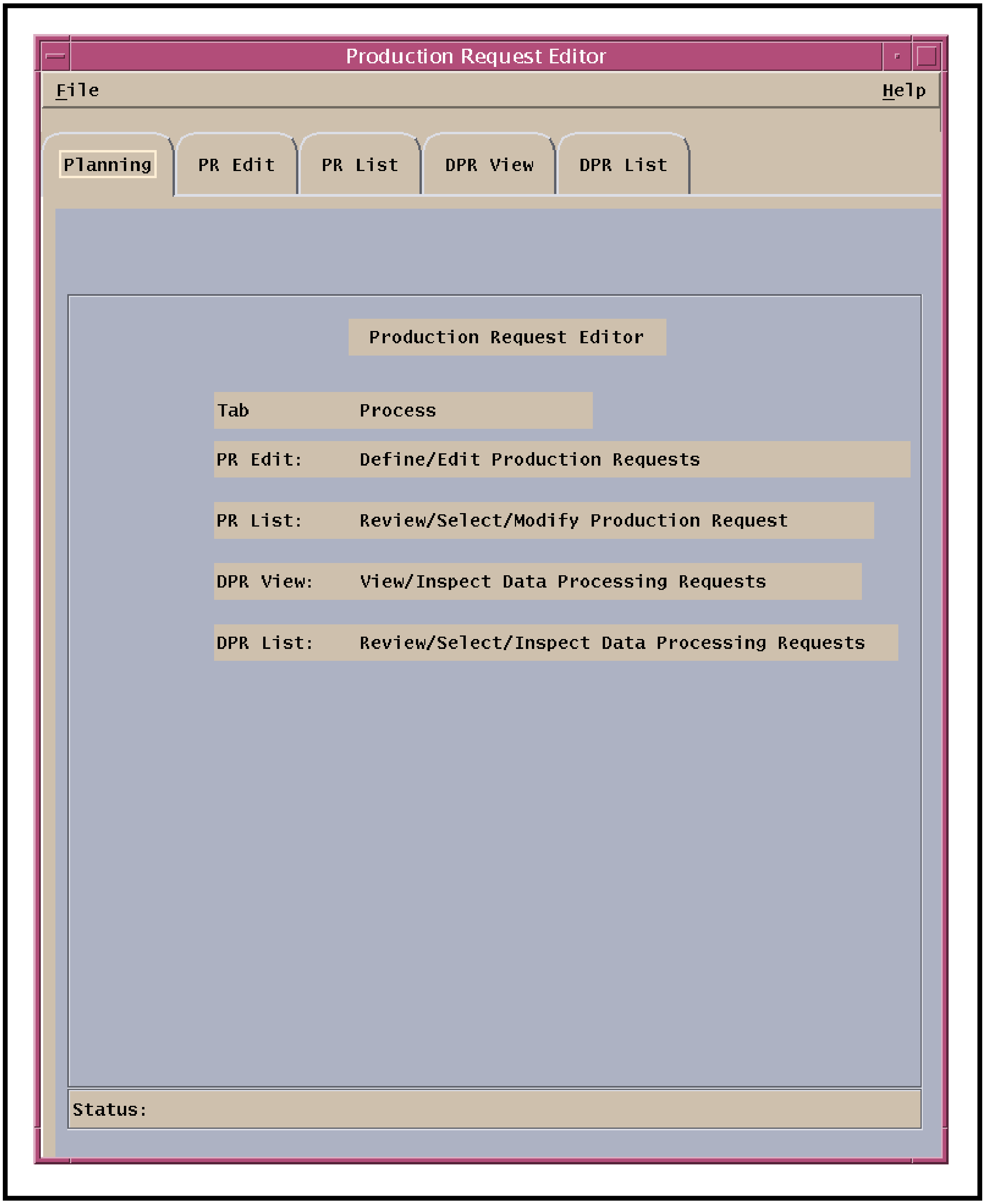

Figure 16. Production Request Editor Introductory GUI

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Creating/Updating/Deleting a Production Request

Creating a New Production Request

The new Production Request process begins when the Production Planner starts the Production Request Editor graphical user interface (GUI) from a UNIX prompt. The Production Planner enters the Request Definition, PGE parameters, duration, production rule related information, and comments for the new Production Request.

Before creating the new PR the Production Planner must be prepared to provide the following information:

- Name of the PR.
- Priority of the PR.
- PGE to be used in processing the PR.
- Start Date.
- Start Time.
- End Date.
- End Time.
- Production rules that affect the PGE and applicable values to be entered (if any).
- Comments (if applicable).

The procedure for creating a new production request starts with the assumption that all applicable servers and the **Production Request Editor** GUI are currently running and the **Production Request Editor** Introductory GUI (Figure 16) is being displayed.

Creating a New Production Request

---

1 Select the Production Request Editor by clicking (single click) on the **PR Edit** tab.

- The **PR Edit** GUI page (Figure 17) is displayed.

2 Click and hold the **PR Type** option button to display a menu of types of production requests, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.

- The following production request types are listed:
  - **Routine**.
  - **On-Demand** [not currently available for selection].

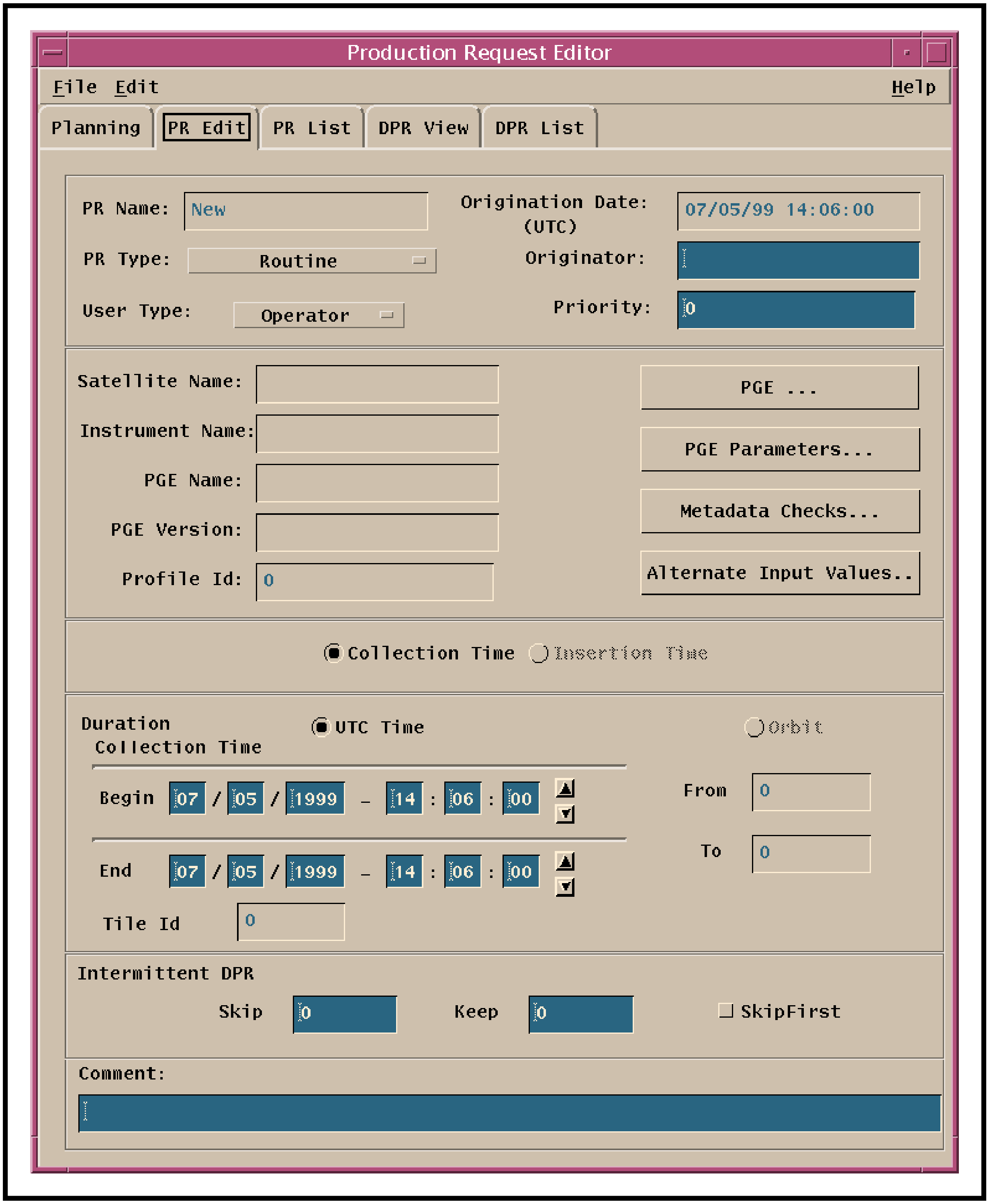

Figure 17. PR Edit GUI

– **Reprocessing.**

– **Ad-hoc Reprocessing**.

3• Click and hold the **User Type** option button to display a menu of types of users, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.

- The following user types are listed:
  - **Operator**.
  - **DAAC Manager**.
  - **Scientist**.
  - **Researcher**.

NOTE:• The **PR Name** and **Origination Date** fields will be filled automatically when the Production Request is saved at the end of the procedure. (You do not need to fill in these fields.)

4• Type the identification of the person creating the production request in the **Originator** field.

- Either UserID or actual name of a person may be used, depending on DAAC policy (if applicable).

5 Type the priority for the PR in the **Priority** field.

- Enter a number in the range of one (1) to ten (10).
  - One (1) has the highest priority; ten (10) has the lowest priority.
- The **Priority** field specifies the **User-Selected Priority** to be included in the Data Processing Request(s) that result(s) from the Production Request.
- **User-Selected Priority** is subsequently weighted according to the value specified in the Production Strategy selected from the Planning Workbench when a Production Plan is created using the Production Request.

6 Click on the **PGE...** button.

- The **PGE Selection** GUI (Figure 18) is displayed.

7 Select the desired PGE from the list by clicking on the appropriate row in the table.

- The PGE list is scrollable. (If there are items on the list in addition to those currently visible in the window, the additional items can be viewed by clicking on the arrows associated with the scrollbars.)

8 Click on the **OK** button.

- The **PR Edit** GUI page (Figure 17) is displayed.

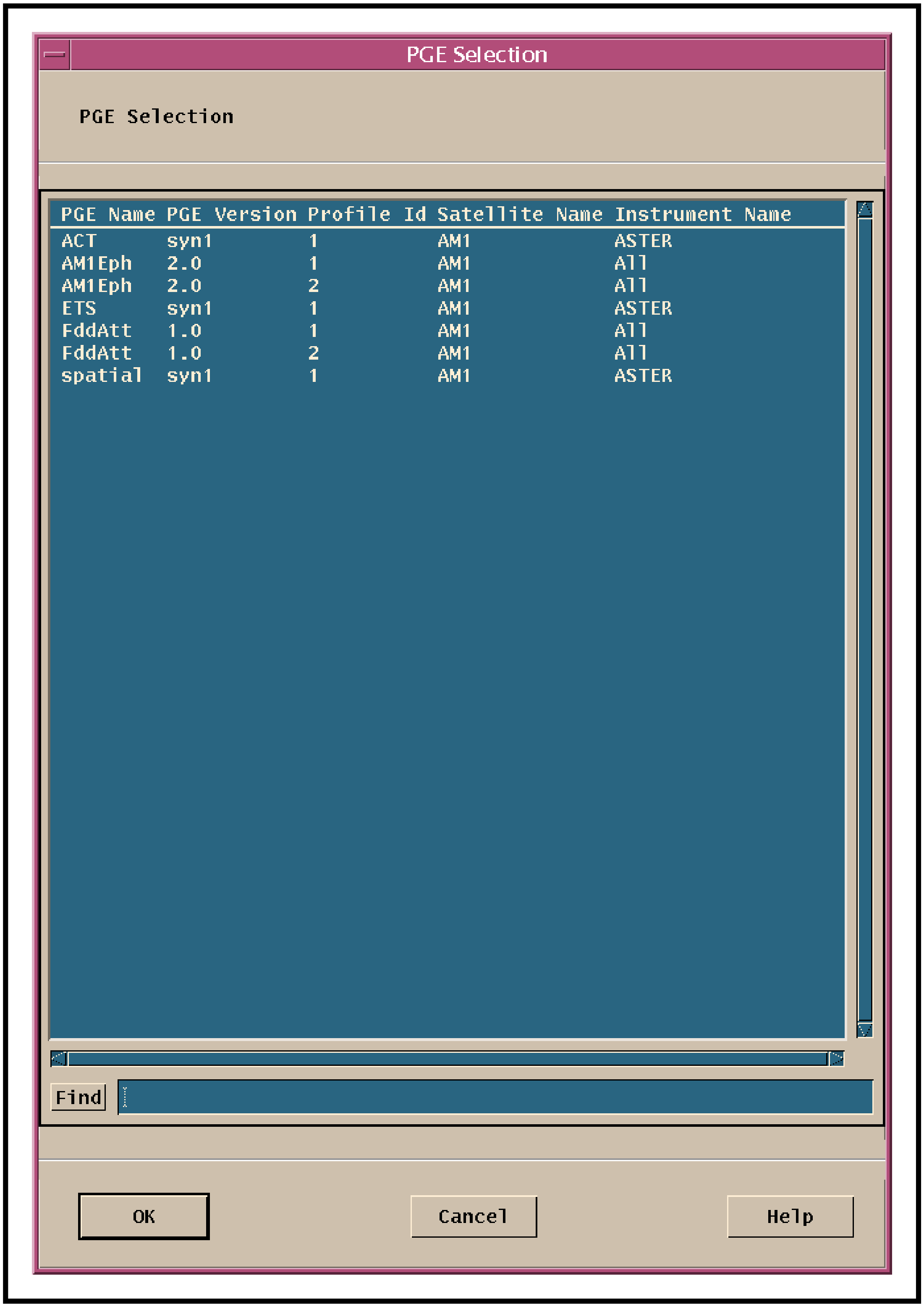

Figure 18. PGE Selection GUI

- The following fields are automatically filled in:
  - **Satellite Name.**
  - **Instrument Name.**
  - **PGE Name.**
  - **PGE Version.**
  - **Profile ID.**

9 Click on the **PGE Parameters…** button.

- The **PGE Parameter Mappings** GUI page (Figure 19) is displayed.
- The **PGE Parameter Mappings** GUI has a table that lists the following information:
  - **Parameter Name.**
  - **Logical Id.**
  - **Default Value.**
  - **Override Value.**
  - **Description.**
- The PGE parameters (if any) listed in the table are the parameters relevant to the particular PGE. (Different PGEs may have different parameters.) The parameters and their default values are defined during the Science Software Integration and Test (SSI&T) process. They are included with the PGE information stored in the PDPS database. The Production Request Editor retrieves the parameter information from the database.

10 If any PGE parameter(s) should be changed, first select (highlight) a parameter to be changed by clicking on the corresponding row in the list of parameters.

- The parameter row is highlighted.
- If you do not change the parameters, the values in the Default column will be used.
- Modify parameter values when and as directed by the customer (e.g., MODIS) only.
  - The SCF will provide notification if PGE parameters other than the default values should be used.
- The PGE parameter mappings list is scrollable.

11 Type the desired value in the **Override Value** field.

12 Click on the **Apply** button at the bottom of the **PGE Parameter Mappings** window.

- The value in the **Override Value** column is updated.

13 If any other parameter is to be changed, repeat Steps 10 through 12.

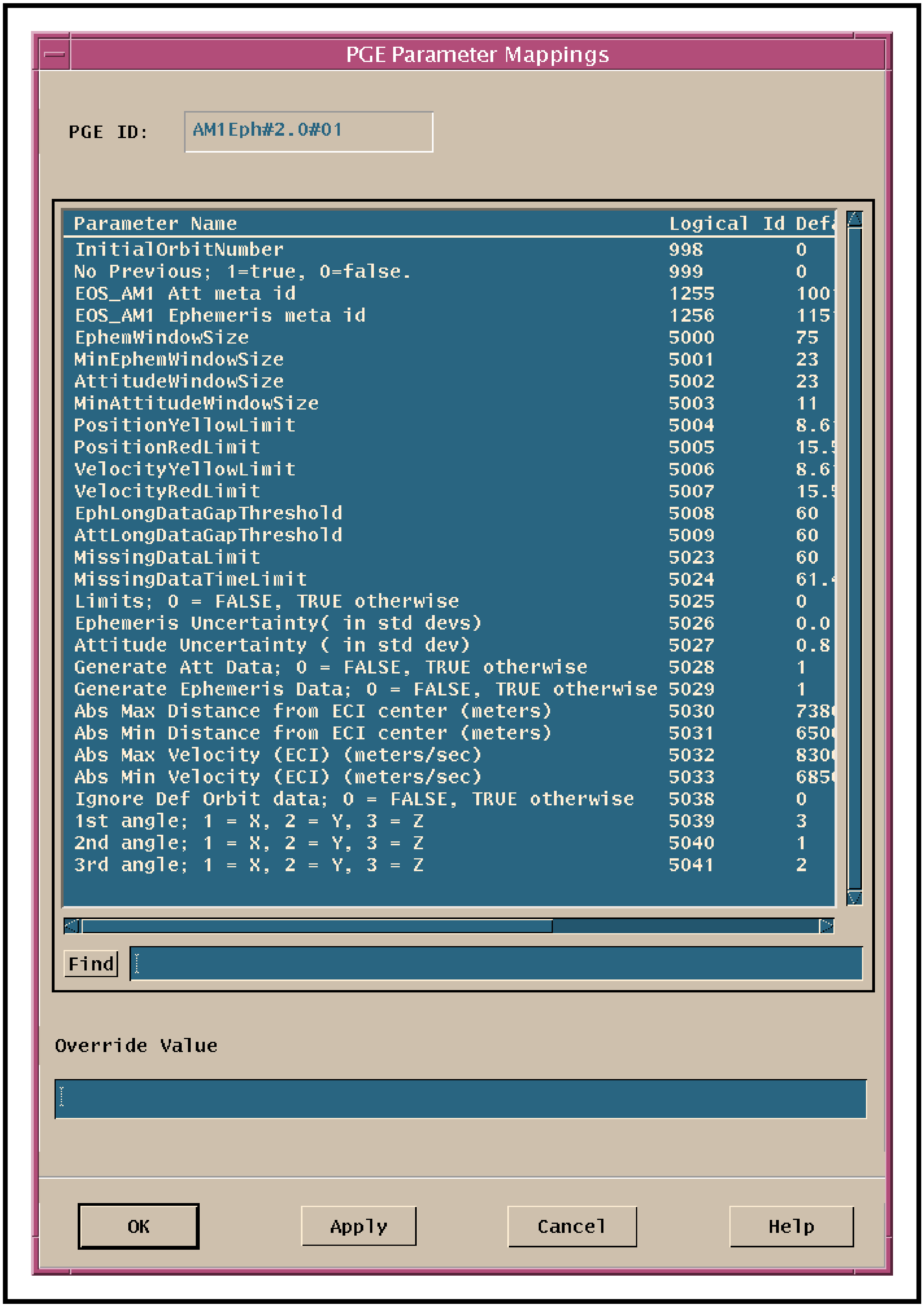

Figure 19. PGE Parameter Mappings GUI

14• Click on the **OK** button at the bottom left of the **PGE Parameter Mappings** window to approve the changes and dismiss the window.

- The **Production Request - PR Edit** GUI (Figure 17) is displayed.

15• If the PGE is subject to a metadata-based production rule and the value(s) to be checked need(s) to be changed, click on the **Metadata Checks…** button.

- If the **Metadata Checks…** button has been selected, perform Steps 16 through 20 as applicable; otherwise go to Step 21.
- The **MetadataChecks** GUI page (Figure 20) is displayed.
- The **MetadataChecks** GUI has an **InputDataType** window that lists input data types.
- In addition, the **MetadataChecks** GUI has a metadata checks (**MetaDataField-Operator-Value-Type**) window in which there is a table that lists the following information concerning each metadata check:
  - **MetaDataField.**
  - **Operator.**
  - **Value.**
  - **Type.**
- Initial values for metadata checks are entered during SSI&T; however, it is possible to modify the values using the **MetadataChecks** GUI when creating a production request.

16• If it is necessary to change any value(s) for metadata checks, first select (highlight) an input data type with a value to be changed by clicking on the corresponding row in the **InputDataType** window.

- The input data type row is highlighted.
- The metadata check information for the highlighted input data type is displayed in the **MetaDataField-Operator-Value-Type** window.

17• Select (highlight) a metadata field with a comparison value to be changed by clicking on the corresponding row in the **MetaDataField-Operator-Value-Type** window.

- The metadata field row is highlighted in the **MetaDataField-Operator-Value-Type** window.
- The identity of the metadata field is displayed in the **MetaDataField** window.

18 Type the new value for the metadata check in the **Value** field.

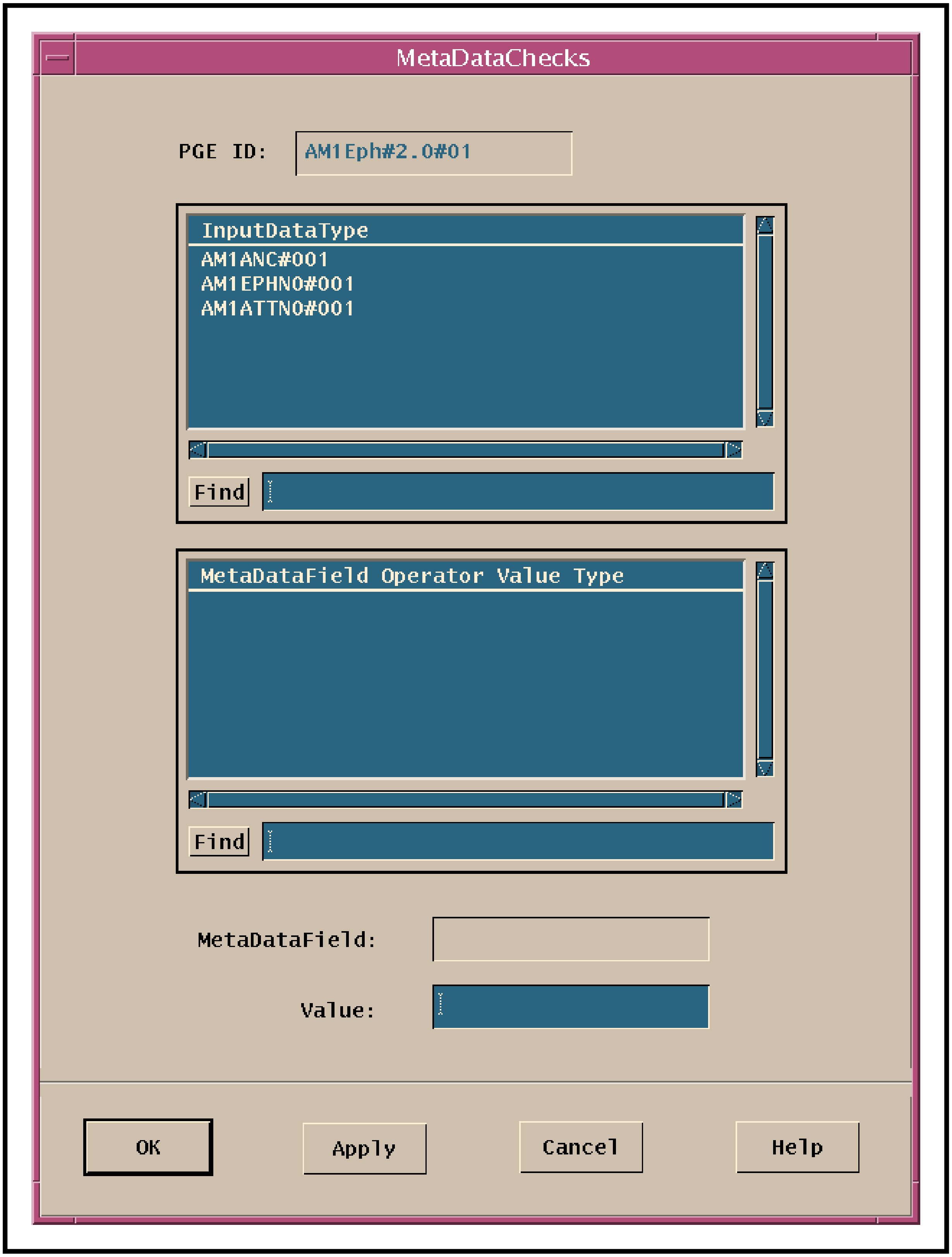

Figure 20. MetadataChecks GUI

19 Click on the appropriate button from the following selections:

- **OK** - to approve the new value and dismiss the **MetadataChecks** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
  - Go to Step 21.
- **Apply** - to approve the new value without dismissing the **MetadataChecks** GUI.
  - Go to Step 20.
- **Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new value.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
  - Go to Step 21.

20• If any additional value(s) to be checked need to be changed, repeat Steps 16 through 19 as necessary.

21• If the PGE is subject to the Alternate Inputs Production Rule and the timer settings or the order of alternate inputs need to be changed, click on the **Alternate Input Values…** button.

- If the **Alternate Input Values…** button has been selected, perform Steps 22 through 27 as applicable; otherwise go to Step 28.
- The **AlternateInputValues** GUI page (Figure 21) is displayed.
- The **AlternateInputValues** GUI has an **AlternateListName** window that lists the applicable alternate inputs.
- In addition, the **AlternateInputValues** GUI has an alternate input (**Order-DataType-LogicalID-Timer**) window in which there is a table that lists the following information concerning each alternate input:
  - **Order.**
  - **DataType.**
  - **LogicalID.**
  - **Timer.**
- The initial set-up for alternate inputs is entered during SSI&T; however, it is possible to modify the set-up using the **AlternateInputValues** GUI when creating a production request.

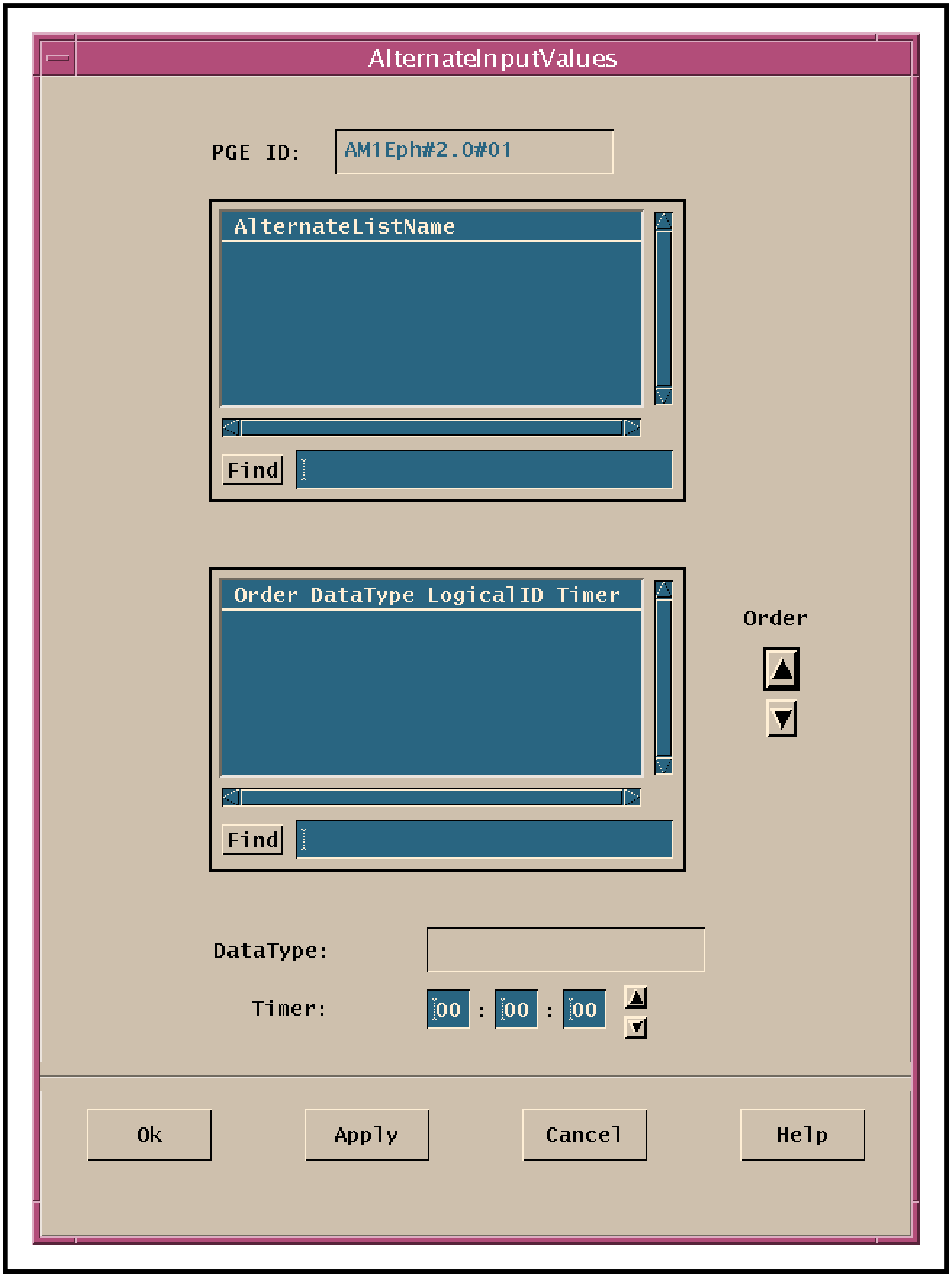

Figure 21. AlternateInputValues GUI

22 If it is necessary to change timer settings or the order of alternate inputs, first select (highlight) an alternate input to be changed by clicking on the corresponding row in the **AlternateListName** window.

- The alternate input row is highlighted.
- Information concerning the highlighted alternate input is displayed in the **Order-DataType-LogicalID-Timer** window.

23 Select (highlight) an alternate input with timer settings or the order of alternate inputs to be changed by clicking on the corresponding row in the **Order-DataType-LogicalID-Timer** window.

- The alternate input row is highlighted in the **Order-DataType-LogicalID-Timer** window.
- The data type of the alternate input is displayed in the **DataType** field.

24 If it is necessary to change the order of alternate inputs, click on the up/down arrow buttons adjacent to the **Order-DataType-LogicalID-Timer** window as necessary until the highlighted alternate input has the proper order listed in the **Order** column of the window.

- If necessary, repeat Steps 23 and 24 to change the order of additional alternate inputs.

25 If the timer setting for an alternate input is to be modified, verify that the alternate input with the timer setting to be changed has been highlighted then type the new timer setting in the **Timer** fields.

- Another method of changing timer settings (other than typing the numbers) is to click in each of the timer fields in turn and click on the up/down buttons adjacent to the **Timer** fields until the correct time is indicated.

26 Click on the appropriate button from the following selections:

- **OK -** to approve the new alternate input setting(s) and dismiss the **AlternateInputValues** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
  - Go to Step 28.
- **Apply** - to approve the new alternate input setting(s) without dismissing the **AlternateInputValues** GUI.
  - Go to Step 27.
- **Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new alternate input setting(s).
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
  - Go to Step 28.

27 If any additional alternate input setting(s) need to be changed, repeat Steps 21 through 26 as necessary.

28 Click on either the **Collection Time** or **Insertion Time** button (as applicable) if data are to be processed on the basis of time (rather than orbit or tile).

- Normally the **Collection Time** (time when the data were collected by the instrument on the satellite) is used for specifying what data are to be processed.
- The **Insertion Time** option is available primarily for ASTER processing to allow the generation of DPRs for all data contained on an ASTER tape received from the ASTER Ground Data System (GDS).

29 Click on either the **UTC Time** (Coordinated Universal Time) button or the **Orbit** button, depending on whether data to be processed is specified by time or orbit.

- If **UTC Time** is selected, perform Steps 30 and 31.
- If **Orbit** is selected go to Step 33.

30 Type the desired data start date and time (in ***MM/DD/YYYY hh:mm:ss*** format) in the **Begin** fields.

- As data are typed in each field the cursor automatically advances to the next field.
- Another method of entering date and time (other than typing the numbers) is to click in each of the date/time fields in turn and click on the up/down buttons adjacent to the date/time fields until the correct date/time is indicated.

31 Type the desired data end date and time (in ***MM/DD/YYYY hh:mm:ss*** format) in the **End** fields.

32 If the Tiling Production Rule applies, type the tile identification in the **Tile Id** field.

- Go to Step 35.

33 If the Orbital Processing Production Rule applies, type the number of the first orbit of data to be processed in the **From** field.

34 If the Orbital Processing Production Rule applies, type the number of the last orbit of data to be processed in the **To** field.

35 If the Intermittent Activation Production Rule applies, type the number of DPRs to skip in the **Skip** field.

- If the Intermittent Activation Production Rule applies, perform Steps 36 and 37.
- If the Intermittent Activation Production Rule does not apply, go to Step 36.

36 Type the number of DPRs to keep in the **Keep** field.

37 If the first DPR is to be skipped, click on the **SkipFirst** button.

38 Type any relevant comments in the **Comments** field.

39 Select **Save As** from the **File** pull-down menu (**File** → **Save As**).

- The **File Selection** window (Figure 22) is displayed.

40 Type a file name for the production request in the **Selection** field.

41 Click on the **OK** button to save the production request.

- The production request is saved and the corresponding DPR(s) is/are generated.
- The **PR Name** and **Origination Date** fields are automatically updated.

42 Select **File** → **New** to clear the entries on the **Production Request Editor** GUI.

- Return to Step 2 to create another new PR.

43 To start the process of exiting from the **Production Request Editor** GUI select **File** → **Exit** from the pull-down menu.

- A **Do you really want to exit?** dialog box is displayed.

44 Click on the appropriate button from the following selections:

- **OK -** to exit from the **Production Request Editor** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is dismissed.
- **Cancel** - to return to the **Production Request - PR Edit** GUI.

It is also possible to create a new PR by editing or modifying an existing PR and renaming it. This is particularly quick and useful if there are only minor differences between the existing PR and the new one.

Editing or Modifying a Production Request

This section explains how to edit or modify a Production Request.

Before you make any changes to a PR, you must know what needs to be changed. You can change any of the following attributes of the PR (depending on the production rules that apply to the PGE):

- Name of the PR (creates a new PR).
- PR type.
- Priority of the PR.
- PGE to be used in processing the PR.
- PGE (run-time) parameters to be used.
- Metadata check values.

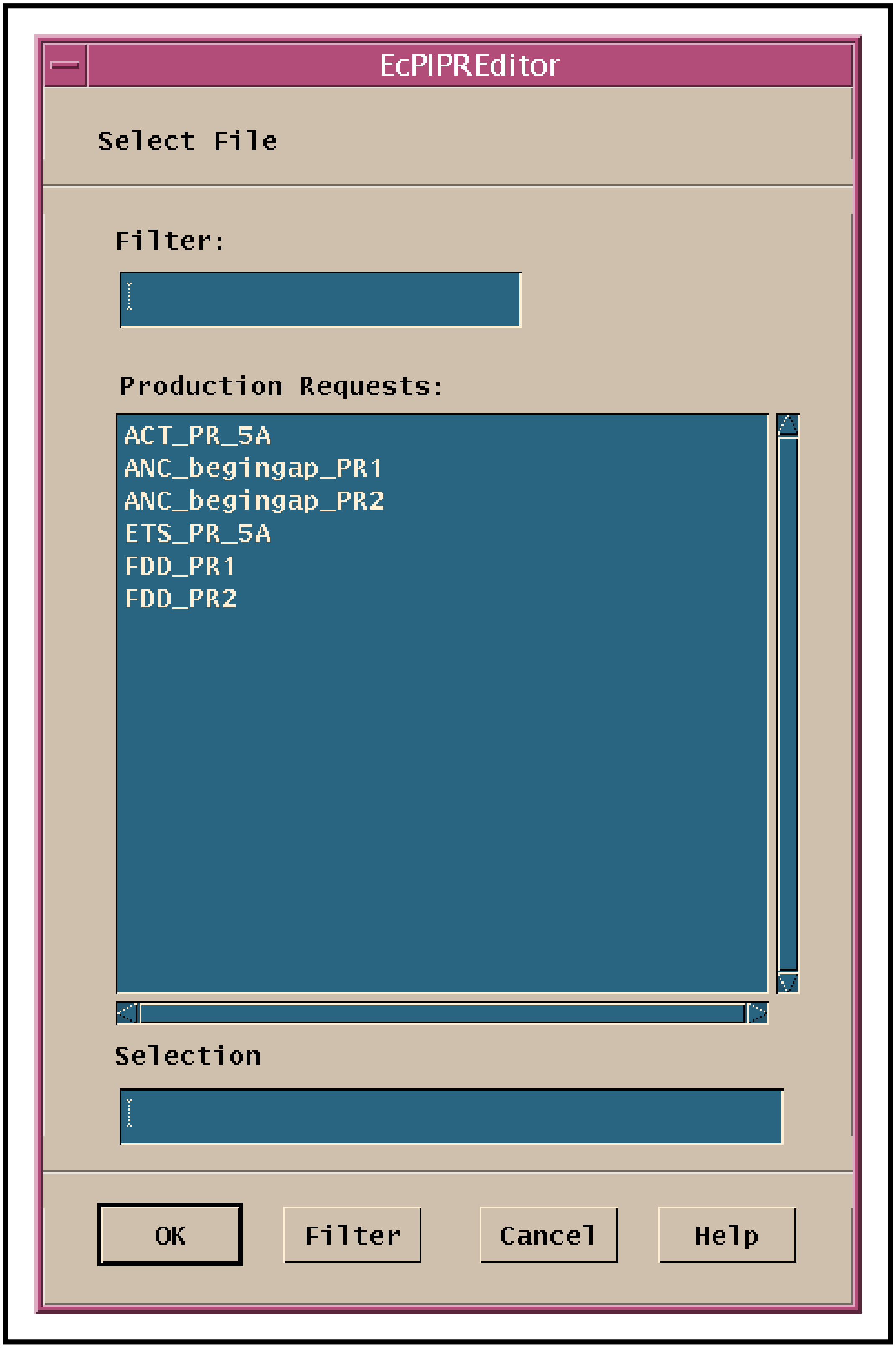

Figure 22. Production Request Editor File Selection Window

- Alternate input order and/or timer setting.
- Start Date.
- Start Time.
- End Date.
- End Time.
- Orbit.
- Tile ID.
- Intermittent DPRs to keep/skip.
- Comments if applicable.

To edit/modify a new Production Request, execute the procedure steps that follow. Perform only those steps of the procedure that are applicable to the changes you want to make. You do not have to go through all of the fields in the PR to successfully modify it. However, you must save the modified PR (Steps 38 - 40) to make the changes effective.

The procedure for editing/modifying a production request starts with the assumption that all applicable servers and the **Production Request Editor** GUI are currently running and the **Production Request Editor** Introductory GUI (Figure 16) is being displayed.

Editing/Modifying a Production Request

---

1 Select the Production Request Editor by clicking (single click) on the **PR Edit** tab.

- The **PR Edit** GUI page (Figure 17) is displayed.

2 Select **File → Open** from the pull-down menu to display a list of Production Requests from which to select the PR to be edited/modified.

- The **File Selection** window (Figure 22) is displayed.

3 Select (highlight) the PR to be edited/modified by clicking on the corresponding PR name in the list of PRs.

- The selected PR is displayed in the **Selection** field.

4 Click on the **OK** button.

5 If the type of production request shown on the **PR Type** option button is not the desired type, click and hold the **PR Type** option button to display a menu of types of production requests, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.

- The following production request types are available:
  - **Routine.**

- **On-Demand** [not currently available for selection].
- **Reprocessing.**
- **Ad-hoc Reprocessing.**

6 If the type of user shown on the **User Type** option button is not the desired type, click and hold the **User Type** option button to display a menu of types of users, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.

- The following user types are listed:
  - **Operator**.
  - **DAAC Manager**.
  - **Scientist**.
  - **Researcher**.

NOTE: The **PR Name** and **Origination Date** fields will be filled automatically when the Production Request is saved at the end of the procedure. (You do not need to fill in these fields.)

7 If the identification of the person editing/modifying the production request is not already displayed in the **Originator** field, type it there.

- Either UserID or actual name of a person may be used, depending on DAAC policy (if applicable).

8 If the PR's priority is to be changed, type the new priority in the **Priority** field.

- Enter a number in the range of one (1) to ten (10).
  - One (1) has the highest priority; ten (10) has the lowest priority.
- The **Priority** field specifies the **User-Selected Priority** to be included in the Data Processing Request(s) that result(s) from the Production Request.
- **User-Selected Priority** is subsequently weighted according to the value specified in the Production Strategy selected from the Planning Workbench when a Production Plan is created using the Production Request.

9 If the PGE is to be changed, click on the **PGE...** button.

- The **PGE Selection** GUI (Figure 18) is displayed.
- Perform Steps 10 and 11 to designate the new PGE.

10 Select the desired PGE by clicking on the appropriate row in the table.

11 Click on the **OK** button.

- The **Production Request - PR Edit** GUI page (Figure 17) is displayed.

- The following fields are automatically filled:
  - **Satellite Name.**
  - **Instrument Name.**
  - **PGE Name.**
  - **PGE Version.**
  - **Profile ID.**

12 If any PGE parameter(s) should be changed, click on the **PGE Parameters...** button.

- The **PGE Parameter Mappings** GUI (Figure 19) is displayed.
- Modify parameter values when and as directed by the customer (e.g., MODIS) only.
  - The SCF will provide notification if PGE parameters other than the default values should be used.
- Perform Steps 13 through 15 to designate the new PGE parameter(s).

13 Select (highlight) a parameter to be changed by clicking on the corresponding row in the list of parameters.

- The parameter row is highlighted.
- If you do not change the parameters, the values in the **Default** column will be used.

14 Type the desired value in the **Override Value** field.

15 Click on the **Apply** button at the bottom of the **PGE Parameter Mappings** window.

- The value in the **Override Value** column is updated.

16 If any other parameter is to be changed, repeat Steps 13 through 15.

17 Click on the **OK** button at the bottom left of the **PGE Parameter Mappings** window to approve the changes and dismiss the window.

- The **Production Request - PR Edit** GUI (Figure 17) is displayed.

18 If any metadata check value needs to be changed, click on the **Metadata Checks…** button.

- The **MetadataChecks** GUI page (Figure 22) is displayed.
- Perform Steps 19 through 23 to change the metadata check value(s).

19 Select (highlight) an input data type with a value to be changed by clicking on the corresponding row in the **InputDataType** window.

- The input data type row is highlighted.

- The metadata check information for the highlighted input data type is displayed in the **MetaDataField-Operator-Value-Type** window.

20 Select (highlight) a metadata field with a comparison value to be changed by clicking on the corresponding row in the **MetaDataField-Operator-Value-Type** window.

- The metadata field row is highlighted in the **MetaDataField-Operator-Value-Type** window.
- The identity of the metadata field is displayed in the **MetaDataField** window.

21 Type the new value for the metadata check in the **Value** field.

22 Click on the appropriate button from the following selections:

- **OK -** to approve the new value and dismiss the **MetadataChecks** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
- **Apply -** to approve the new value without dismissing the **MetadataChecks** GUI.
- **Cancel -** to return to the **Production Request - PR Edit** GUI without saving the new value.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.

23 Repeat Steps 20 through 22 as necessary to change any additional value(s) to be checked.

24 If any alternate input timer settings or the order of alternate inputs should be changed, click on the **Alternate Input Values…** button.

- The **AlternateInputValues** GUI page (Figure 21) is displayed.
- Perform Steps 25 through 30 as applicable to change alternate input timer settings or the order of alternate inputs.

25 Select (highlight) an alternate input to be changed by clicking on the corresponding row in the **AlternateListName** window.

- The alternate input row is highlighted.
- Information concerning the highlighted alternate input is displayed in the **Order-DataType-LogicalID-Timer** window.

26 Select (highlight) an alternate input with timer settings or the order of alternate inputs to be changed by clicking on the corresponding row in the **Order-DataType-LogicalID-Timer** window.

- The alternate input row is highlighted in the **Order-DataType-LogicalID-Timer** window.
- The data type of the alternate input is displayed in the **DataType** field.

27 To change the order of alternate inputs click on the up/down arrow buttons adjacent to the **Order-DataType-LogicalID-Timer** window as necessary until the highlighted alternate input has the proper order listed in the **Order** column of the window.

- Repeat Steps 26 and 27 as necessary to change the order of additional alternate inputs.

28 To modify the timer setting for an alternate input verify that the alternate input with the timer setting to be changed has been highlighted then type the new timer setting in the **Timer** fields.

29 Click on the appropriate button from the following selections:

- **OK** - to approve the new alternate input setting(s) and dismiss the **AlternateInputValues** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.
- **Apply** - to approve the new alternate input setting(s) without dismissing the **AlternateInputValues** GUI.
- **Cancel** - to return to the **Production Request - PR Edit** GUI without saving the new alternate input setting(s).
  - The **Production Request - PR Edit** GUI (Figure 17) is displayed.

30 Repeat Steps 23 through 27 as necessary to change any additional alternate input setting(s).

31 If **UTC Time** is to be changed, first click on either the **Collection Time** or **Insertion Time** button (as applicable).

- Normally the **Collection Time** (time when the data were collected by the instrument on the satellite) is used for specifying what data are to be processed.
- The **Insertion Time** option is available primarily for ASTER processing to allow the generation of DPRs for all data contained on an ASTER tape received from the ASTER Ground Data System (GDS).

32 If **UTC Time** is to be changed, type the desired data start date and time (in ***MM/DD/YYYY hh:mm:ss*** format) in the **Begin** fields.

33 If **UTC Time** is to be changed, type the desired data end date and time (in ***MM/DD/YYYY hh:mm:ss*** format) in the **End** fields.

34 If the Tile ID is to be changed, type the tile identification in the **Tile Id** field.

35 If the start of the Orbit range is to be changed, type the number of the first orbit of data to be processed in the **[Orbit] From** field.

36 If the end of the Orbit range is to be changed, type the number of the last orbit of data to be processed in the **[Orbit] To** field.

37 If the number of DPRs to be skipped is to be changed, type the number of DPRs to skip in the **Skip** field.

38 If the number of DPRs to be kept is to be changed, type the number of DPRs to keep in the **Keep** field.

39 If the state of the **SkipFirst** button is to be changed, click on the **SkipFirst** button.

40 Type any relevant comments in the **Comments** field.

41 Select **Save As** from the **File** pull-down menu (**File → Save As**).

- The **File Selection** window (Figure 22) is displayed.

42 Type a file name for the production request in the **Selection** field.

43 Click on the **OK** button to save the production request.

- The Production Request is saved and the corresponding DPR(s) is/are generated.
- The **PR Name** and **Origination Date** fields are automatically updated.

44 Select **File → New** to clear the entries on the **Production Request Editor** GUI.

- Return to Step 1 to modify another new PR.

45 To start the process of exiting from the **Production Request Editor** GUI select **File → Exit** from the pull-down menu.

- A **Do you really want to exit?** dialog box is displayed.

46 Click on the appropriate button from the following selections:

- **OK** - to exit from the **Production Request Editor** GUI.
  - The **Production Request - PR Edit** GUI (Figure 17) is dismissed.
- **Cancel** - to return to the **Production Request - PR Edit** GUI.

Deleting a Production Request

To delete a Production Request, execute the procedural steps that follow. The procedure starts with the assumption that all applicable servers are currently running and the **Production Request Editor** Introductory GUI (Figure 16) is being displayed.

Deleting a Production Request

---

1 Select the list of Production Requests by clicking on the **PR List** tab.

- The **PR List** GUI page (Figure 23) is displayed.

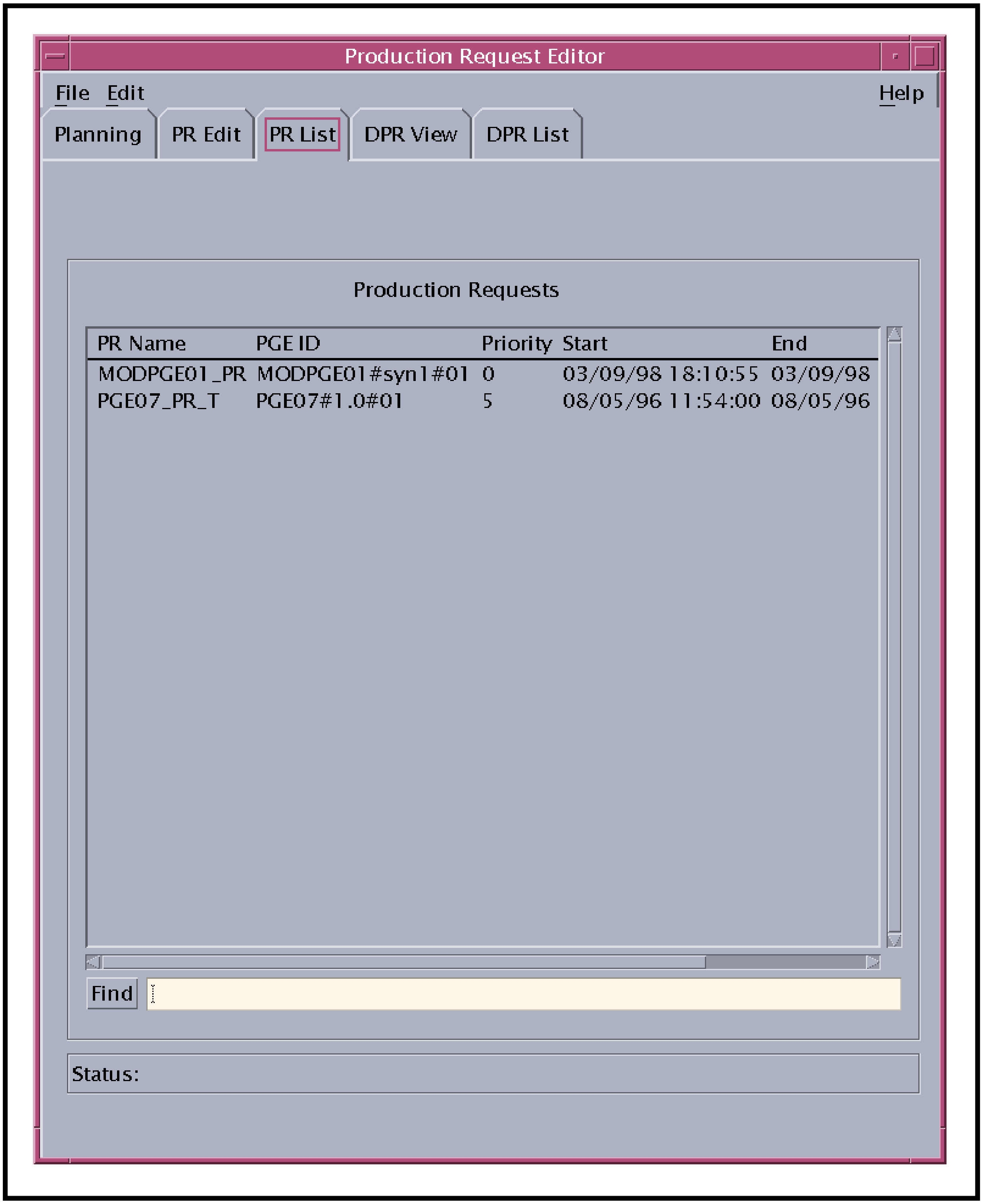

Figure 23. PR List GUI

- A list of Production Requests is displayed.

2 Click on the Production Request to be deleted.

- The Production Request to be deleted is highlighted.

3 Select **Edit→Delete**.

- A dialog box is displayed requesting confirmation of the decision to delete the Production Request.

4 Select **OK** to delete the Production Request.

- A confirmation notice is displayed after completion of deletion.

5 To start the process of exiting from the **Production Request Editor** GUI select **File → Exit** from the pull-down menu.

- A **Do you really want to exit?** dialog box is displayed.

6 Click on the appropriate button from the following selections:

- **OK** - to exit from the **Production Request Editor** GUI.
  - The **Production Request Editor** GUI is dismissed.
- **Cancel** - to return to the **Production Request Editor** GUI.

Reviewing/Deleting Data Processing Requests

Data Processing Requests

Data Processing Requests (DPRs) are generated automatically by the Planning Subsystem.

- DPR is generated automatically from…
  - a PR (which specifies a PGE).
  - information on the PGE acquired during the Science Software Integration and Test (SSI&T) process.
- DPRs are complex, reflecting the complexity of the PGEs.
- DPRs contain information that is used by the Data Processing Subsystem and the AutoSys production scheduling software.

The Production Planner can review DPRs.

- DPRs may provide useful information.
- DPR fields cannot be edited by Operations personnel.
  - Modifications to DPR information would have undesirable side-effects.

Displaying DPR Information

The Production Request Editor can display DPR information in two ways:

- DPR List.
- Data concerning an individual DPR.

The following characteristics pertain to the DPR List:

- The DPR list is filtered, so that only DPRs associated with a particular PR are displayed.
- Each line of the DPR List display represents a DPR, i.e., a job that will be run when all data and resource needs have been satisfied.
- For each DPR the list includes the DPR identification, relevant PGE, name of the corresponding PR, data start date and time, etc.

The Production Planner can select a particular DPR and obtain data on that DPR, including the following characteristics:

- PGE parameters
  - displayed in the same format as the **PGE Parameter Mappings** GUI (Figure 19) used in creating a PR.
- PGE File Mappings (UR File Mappings)
  - displays the input and output files for a particular DPR on the **UR File Mappings** GUI (Figure 24)
  - GUI displays one line of information for each file that may be used by or be produced by the PGE, including the following data:
    - Logical ID - The identification (ID) or tag used within the PGE to access the file.
    - Granule ID - The reference used to identify the granule uniquely.
    - Start/Stop Time - The start and stop date and time for the data contained in this file.
    - Availability - Data and time when the data file is expected to be accessible for use in processing.
    - UR (Universal Reference) - The uniform reference for each object associated with Science Data Processing (SDP) that allows each SDP service to understand and support the object.

The procedure for reviewing data processing requests starts with the assumption that all applicable servers and the **Production Request Editor** GUI are currently running and the **Production Request Editor** Introductory GUI (Figure 16) is being displayed.

Reviewing Data Processing Requests

1 Select the **Data Processing Request List** by clicking on the **DPR List** tab.

- The **DPR List** GUI page (Figure 25) is displayed.
- The table shown on the GUI provides the following information on the DPRs:
  - **DPR Id** - identification (name) of the DPR.
  - **PGE Id** - identification of the PGE specified in the DPR.
  - **PR Name** - name of the PR that led to the creation of the DPR.
  - **Data Start Time** - DPR's start date and time.
  - **Data Stop Time** - DPR's stop date and time.

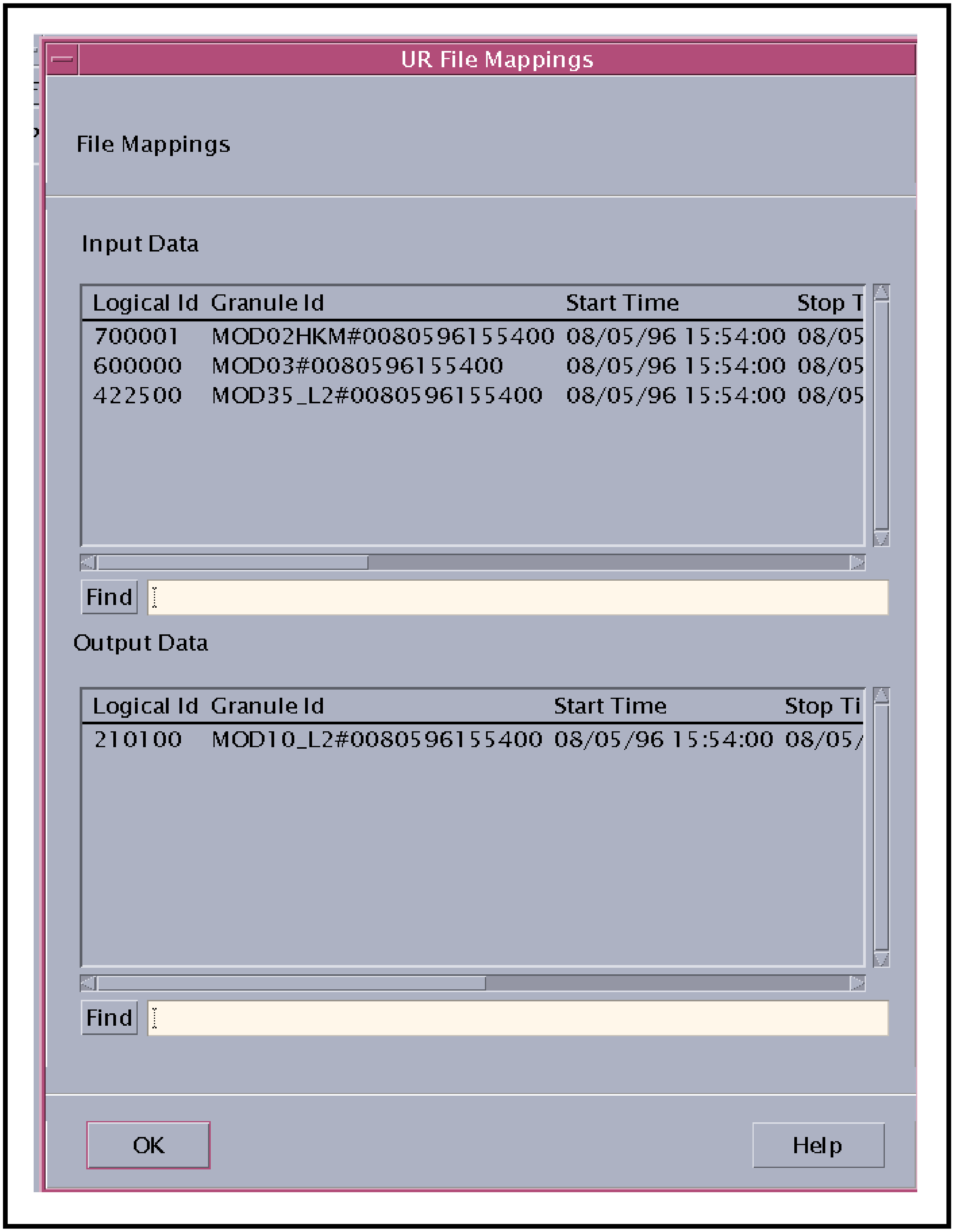

Figure 24. UR File Mappings GUI

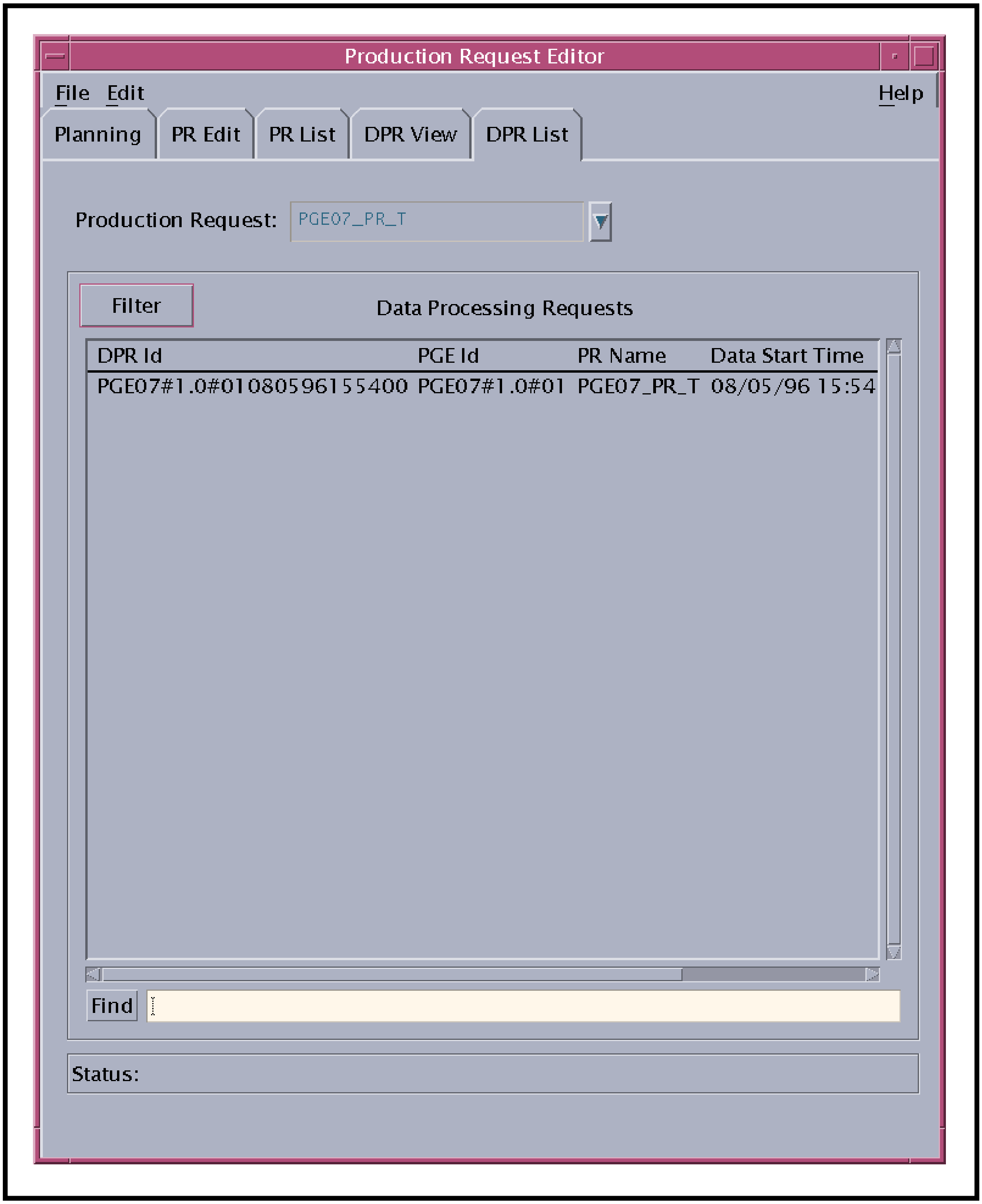

Figure 25. DPR List GUI

2 To list the DPRs associated with a particular Production Request, first click on the option button associated with the **Production Request** field.

- An option menu of Production Requests is displayed.

3 Highlight the desired PR in the option menu then click on the **Filter** button.

- The DPRs for the specified PR only are shown in the **DPR List**.
- An alternative method of filtering PRs is to type the name of the PR in the **Production Request** field then click on the **Filter** button.

4 Identify a DPR to be reviewed from those shown in the list of Data Processing Requests, then click on the **DPR View** tab.

- The **DPR View** GUI (Figure 26) is displayed.

5 Select **File** → **Open** from the pull-down menu.

- The **DPR File Selection** window (Figure 27) is displayed.
- The Data Processing Requests associated with the selected PR are listed.

6 Select (highlight) the DPR to be reviewed by clicking on the corresponding DPR name in the list of DPRs.

7 Click on the **OK** button.

- The **DPR View** GUI shows the following information concerning the selected DPR:
  - **DPR Name**.
  - **PR Name**.
  - **Origination Date**
  - **Originator**
  - **PGE Id**.
  - **Data Start Time**.
  - **Data Stop Time**.
  - **Predicted Start Date**.
  - **Predicted Start Time**.
  - **Actual Start Date**.
  - **Actual Start Time**.
  - **Priority**.
  - **Status**.

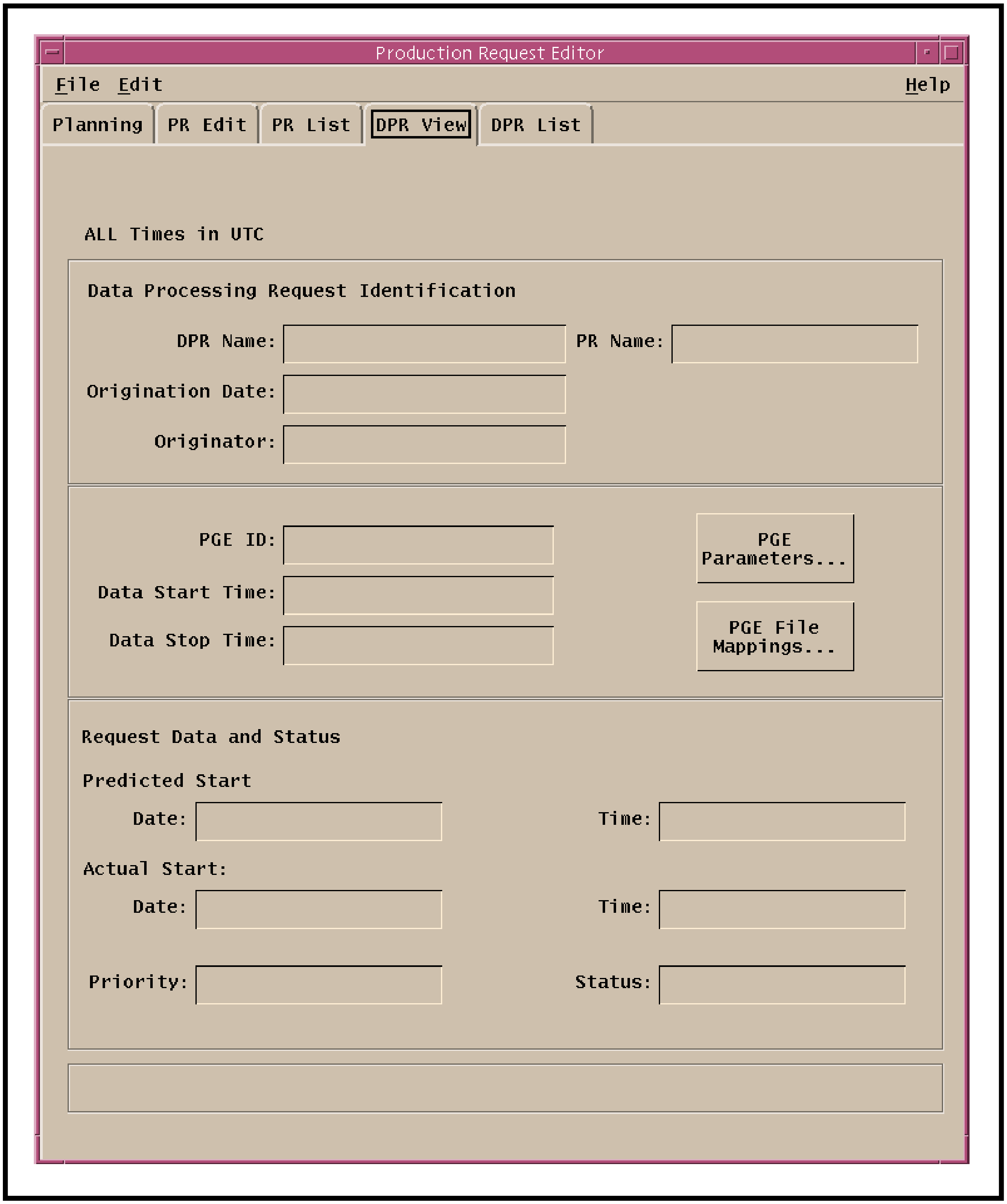

Figure 26. DPR View GUI

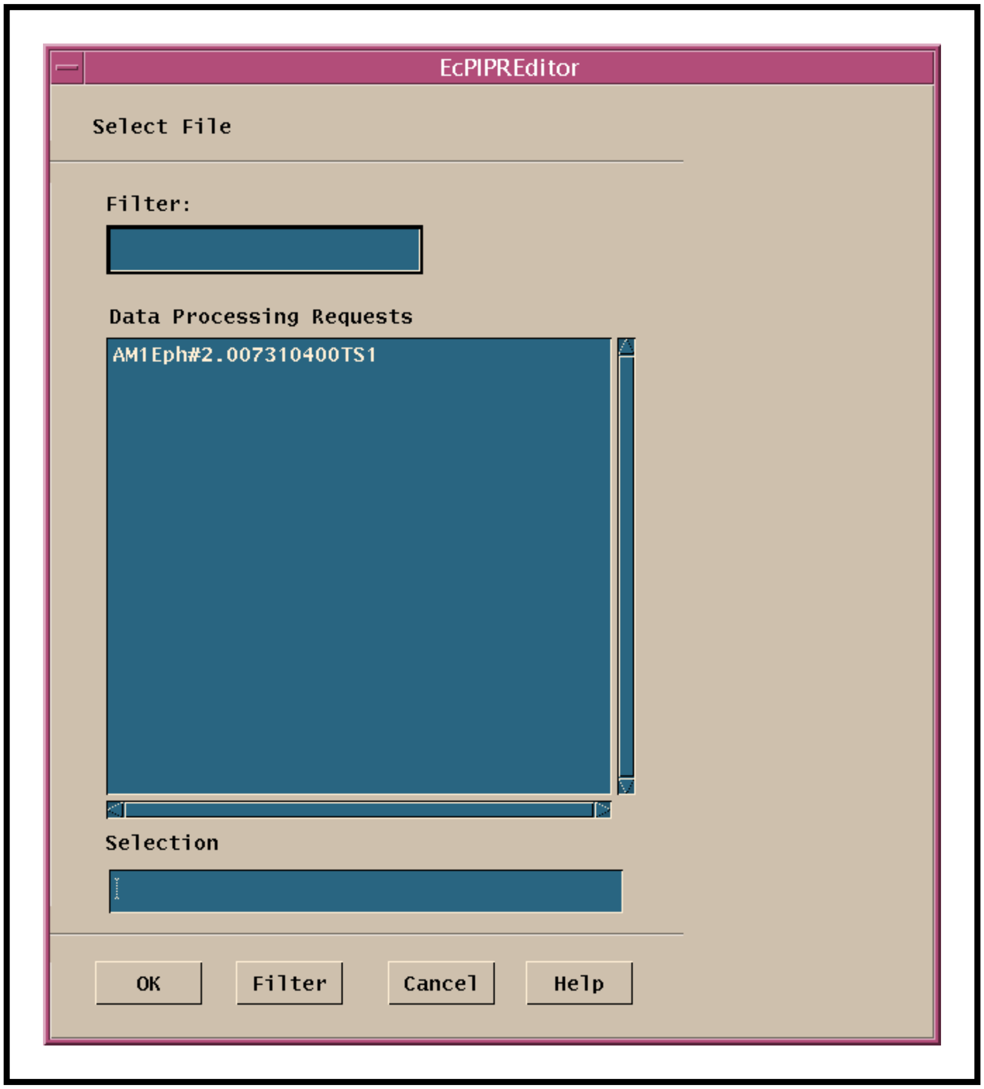

Figure 27. DPR File Selection Window

8 To obtain information concerning the PGE parameters (of the PGE associated with the DPR), click on the **PGE Parameters...** button.

- The **PGE Parameters** GUI (same format as Figure 19 except there is no **Parameter Mapping** field) is displayed.

9 When finished reviewing the PGE parameters, click on the **OK** button to return to the **DPR View** GUI.

- The **DPR View** GUI (Figure 26) is displayed.

10 Click on the **PGE File Mappings...** button.

- The **UR File Mappings** GUI (Figure 24) is displayed.

- The **UR File Mappings** GUI displays one line of information for each file that may be used by or be produced by the PGE associated with the selected DPR:
  - **Logical Id**.
  - **Granule Id**
  - **Start Time** (date and time).
  - **Stop Time** (date and time).
  - **Availability** (date and time).
  - **UR** (universal reference).
- The PGE’s input data and output data are displayed in separate areas.

11 When finished reviewing the **UR File Mappings**, click on the **OK** button to return to the **DPR View** GUI.

- The **DPR View** GUI is displayed.

12 Review the **Data Start Time** and **Data Stop Time**.

13 Review the **Request Data and Status** area of the GUI.

- The **DPR View** GUI displays the following information concerning the selected DPR:
  - **Predicted Start Date** and **Time**.
  - **Actual Start Date** and **Time**.
  - **Priority**.
  - **Status**.
- **Predicted Start Date/Time** and **Actual Start Date/Time** are displayed only if the Production Request has been scheduled.

14 When finished reviewing information concerning the DPR, repeat Steps 1 through 13 to review additional DPRs.

15 To start the process of exiting from the **Production Request Editor** GUI select **File → Exit** from the pull-down menu.

- A **Do you really want to exit?** dialog box is displayed.

16 Click on the appropriate button from the following selections:

- **OK** - to exit from the **Production Request Editor** GUI.
  - The **Production Request Editor** GUI is dismissed.
- **Cancel** - to return to the **Production Request Editor** GUI.

Deleting a Data Processing Request

To delete a DPR, execute the procedure steps that follow. The procedure starts with the assumption that all applicable servers are currently running and the **Production Request Editor** Introductory GUI (Figure 16) is being displayed.

Deleting a Data Processing Request

---

1 Select the DPR List by clicking on the **DPR List** tab.

- The **DPR List** GUI page (Figure 25) is displayed.

2 Click on the **Production Request** option button.

- A list of Processing Requests is displayed.

3 Click on the Production Request with which the DPR to be deleted is associated.

- The Production Request is displayed in the **Production Request** field.

4 Click on the **Filter** button.

- A list of the DPRs associated with the selected Production Request is displayed.

5 Click on the DPR to be deleted.

- The DPR to be deleted is highlighted.

6 Select **Edit→Delete**.

- A dialog box is displayed requesting confirmation of the decision to delete the DPR.

7 Select **OK** to delete the DPR.

- A confirmation notice is displayed after completion of deletion.

8 To start the process of exiting from the **Production Request Editor** GUI select **File → Exit** from the pull-down menu.

- A **Do you really want to exit?** dialog box is displayed.

9 Click on the appropriate button from the following selections:

- **OK** - to exit from the **Production Request Editor** GUI.
  - The **Production Request Editor** GUI is dismissed.
- **Cancel** - to return to the **Production Request Editor** GUI.

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Submitting or Withdrawing a Subscription

Submitting or Withdrawing a Subscription Using the Subscription Editor

The Subscription Editor is a character-based user interface that may be used to either submit or withdraw subscriptions for notification of data arrival (i.e., insertion of data into the archive) or other subscribable system events.

- Subscriptions may be submitted on behalf of a general user or on behalf of the Planning Subsystem (i.e., the PLS Subscription Manager).
- An advantage of the character-based Subscription Editor over the Subscription GUI is the ability to submit subscriptions without being a registered user of ECS.

Submitting or withdrawing a subscription using the Subscription Editor starts with the assumption that the applicable servers are running and the Production Planner has logged in to the ECS system.

Submitting or Withdrawing a Subscription Using the Subscription Editor

NOTE: Commands in Steps 1 through 8 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Open another UNIX (terminal) window.

3 Start the log-in to the Planning/Management Workstation by typing **/tools/bin/ssh** ***hostname*** (e.g., **e0pls03**, **g0pls01**, **l0pls02**, or **n0pls02**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 4.
- If you have not previously set up a secure shell passphrase; go to Step 5.

4 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 6.

5 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

6 Type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g,, cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

7 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the production planning startup scripts (e.g., EcPlSubsEditStart).

8 Type **EcPlSubsEditStart *MODE ApplicationID*** then press **Return/Enter** to launch the Subscription Editor.

- The following message is displayed:
  - **This program may be used to submit subscriptions for notification of data arrivals, on behalf of a general user, or on behalf of the PDPS production system (i.e. the PLS Subscription Manager)**
Would you like to view the complete list of ESDTs known to PDPS? (y/n):

9 Type either **y** or **n** (as appropriate) then press **Return/Enter**.

- Either lower-case or upper-case letters may be typed.
- If **y** was typed, a message similar to the following message is displayed:
  - **AP#0 Subscription Flag: 1**
DAP#0 Subscription Flag: 1
FAILPGE#0 Subscription Flag: 1
MOD00#0 Subscription Flag: 0
MOD01#0 Subscription Flag: 0
MOD021KM#0 Subscription Flag: 0
MOD02LUT#0 Subscription Flag: 0
MOD03#0 Subscription Flag: 0
MOD03LUT#0 Subscription Flag: 0
MOD29#0 Subscription Flag: 0
PGEEXE#0 Subscription Flag: 1
PH#0 Subscription Flag: 1
SSAPC#0 Subscription Flag: 1
Is recipient PLS Subscription Manager (Y/N):

- If **n** was typed, the following message is displayed:
  - **Is recipient PLS Subscription Manager (Y/N):**

10 Type either **y** or **n** (as appropriate) then press **Return/Enter**.

- If **y** was typed, the following message is displayed:
  - **Enter ESDT data type name (as appears in the PDPS database):**
- If **y** was typed, skip Steps 11 and 12, and go to Step 13.
- If **n** was typed, the following message is displayed:
  - **Enter user id:**

11 In response to the “Enter user id” message type the appropriate ***UserID*** then press **Return/Enter**.

- The following message is displayed:
  - **Enter email address (for subscription notification):**

12 In response to the “Enter email address…” message type the appropriate ***e-mail address*** then press **Return/Enter**.

- The following message is displayed:
  - **Enter ESDT data type name (as appears in the PDPS database):**

13 Type the ESDT data type name (e.g., **FAILPGE#0 Subscription Flag: 1**) then press **Return/Enter**.

- The following message is displayed:
  - **Override the provider [SYSTEM] defined for this ESDT (Y/N)**

14 Type either **Y** or **N** (as appropriate) then press **Return/Enter**.

- The following message is displayed:
  - **Submit(S)/Withdraw(W) :**

15 Type either **S** or **W** (as appropriate) then press **Return/Enter**.

- If **S** was typed, the following message is displayed:
  - **Specify the Internal Service Name**
    Enter 'd' for default Insert Event service
- If **W** was typed, the following message is displayed:
  - **Specify the Internal Service Name**

16 Type either ***internal service name*** or **d** (as appropriate) then press **Return/Enter**.

- A message similar to the following message is displayed:
  - **Client Path: /.:/subsys/ecs/TS2/EcIoAdServer**
    client: server binding is 03b894b0-c7e6-11d1-a691-
    9b9d7b23aa77@ncacn_ip_tcp:155.
    157.123.35[58765]
    Client Path: /.:/subsys/ecs/TS2/EcIoAdServer
    client: server binding is 03b894b0-c7e6-11d1-a691-
    9b9d7b23aa77@ncacn_ip_tcp:155.
    157.123.35[58764]
    Client Path: /.:/subsys/ecs/TS2/EcSbSubServer

Launching Planning Workbench-Related GUIs

Launching Planning Workbench-Related GUIs

The following software applications are associated with the Planning Workbench:

- Subscription Manager.
- System Name Server.
- Message Handler.
- Resource Model.
- Planning Workbench.
- Production Timeline.
- Production Strategies.

Access to the Planning Workbench GUIs is gained through the use of UNIX commands.

Launching Planning Workbench-related GUIs starts with the assumption that the applicable servers are running and the Production Planner has logged in to the ECS system.

Launching Planning Workbench-Related GUIs

NOTE: Commands in Steps 1 through 9 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Planning/Management Workstation by typing **/tools/bin/ssh** ***hostname*** (e.g., **e0pls03**, **g0pls01**, **l0pls02**, or **n0pls02**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** ("**y**" alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g,, cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

8 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the production planning startup scripts (e.g., EcPlPRE_IFStart).
- The ***MODE*** will most likely be one of the following operating modes:
  - — OPS (for normal operation).
  - — TS1 (for SSI&T).
  - — TS2 (new version checkout).
- Note that the separate subdirectories under /usr/ecs apply to (describe) different operating modes.

9 Type **EcPlAllStart *MODE ApplicationID*** then press **Return/Enter** to launch the Message Handler, System Name Server, Resource Model, **Planning Workbench** GUI, and **Production Planning Timeline** GUI.

- The **Message Handler** GUI (Figure 28) is displayed.

- Eventually, the **Planning Workbench** GUI (Figure 29) is displayed. Then the **Production Planning Timeline** GUI (Figure 30) is displayed.
  - The **Production Planning Timeline** GUI usually occupies the entire screen when it is initially displayed.

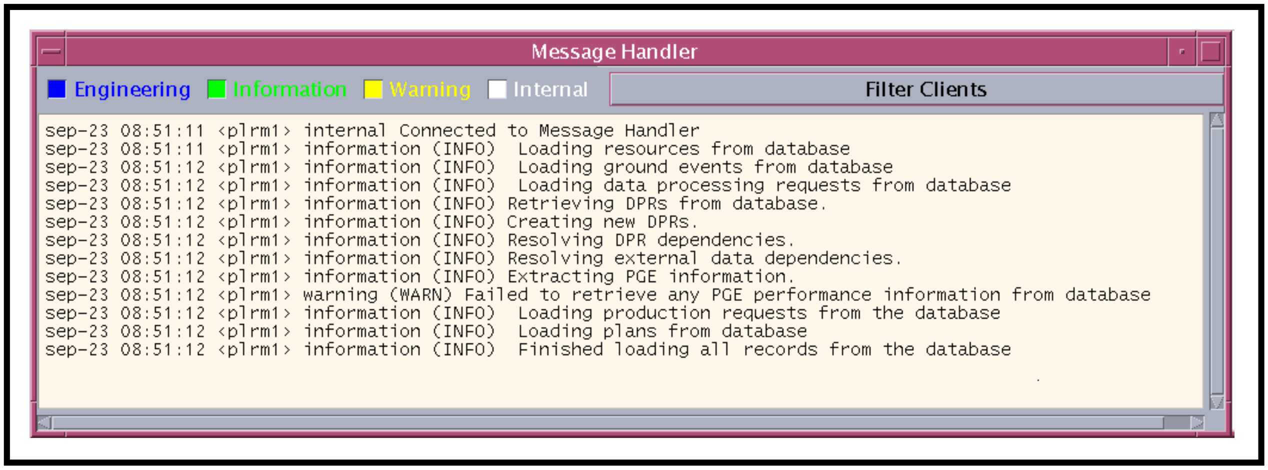

Figure 28. Message Handler GUI

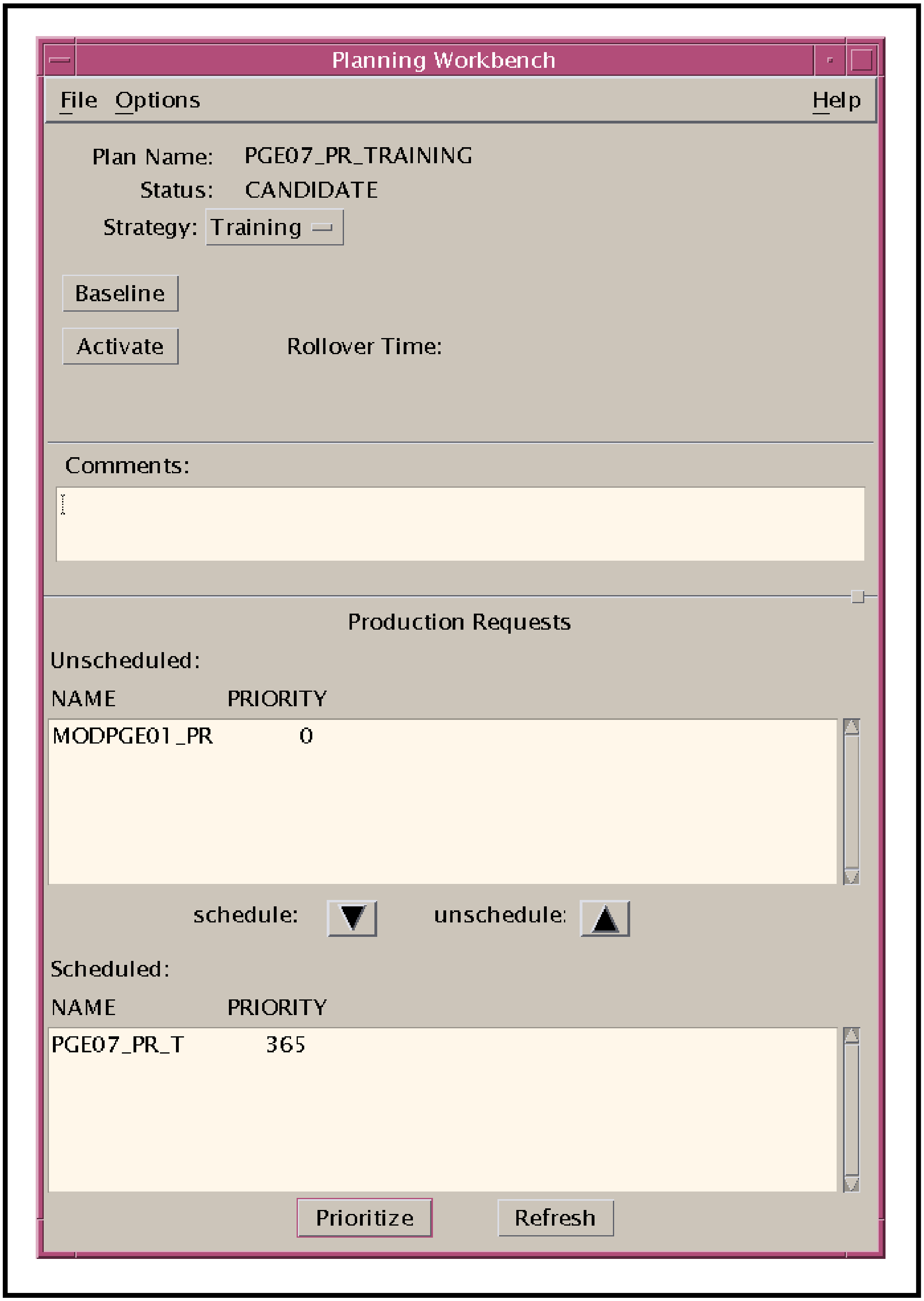

Figure 29. Planning Workbench GUI

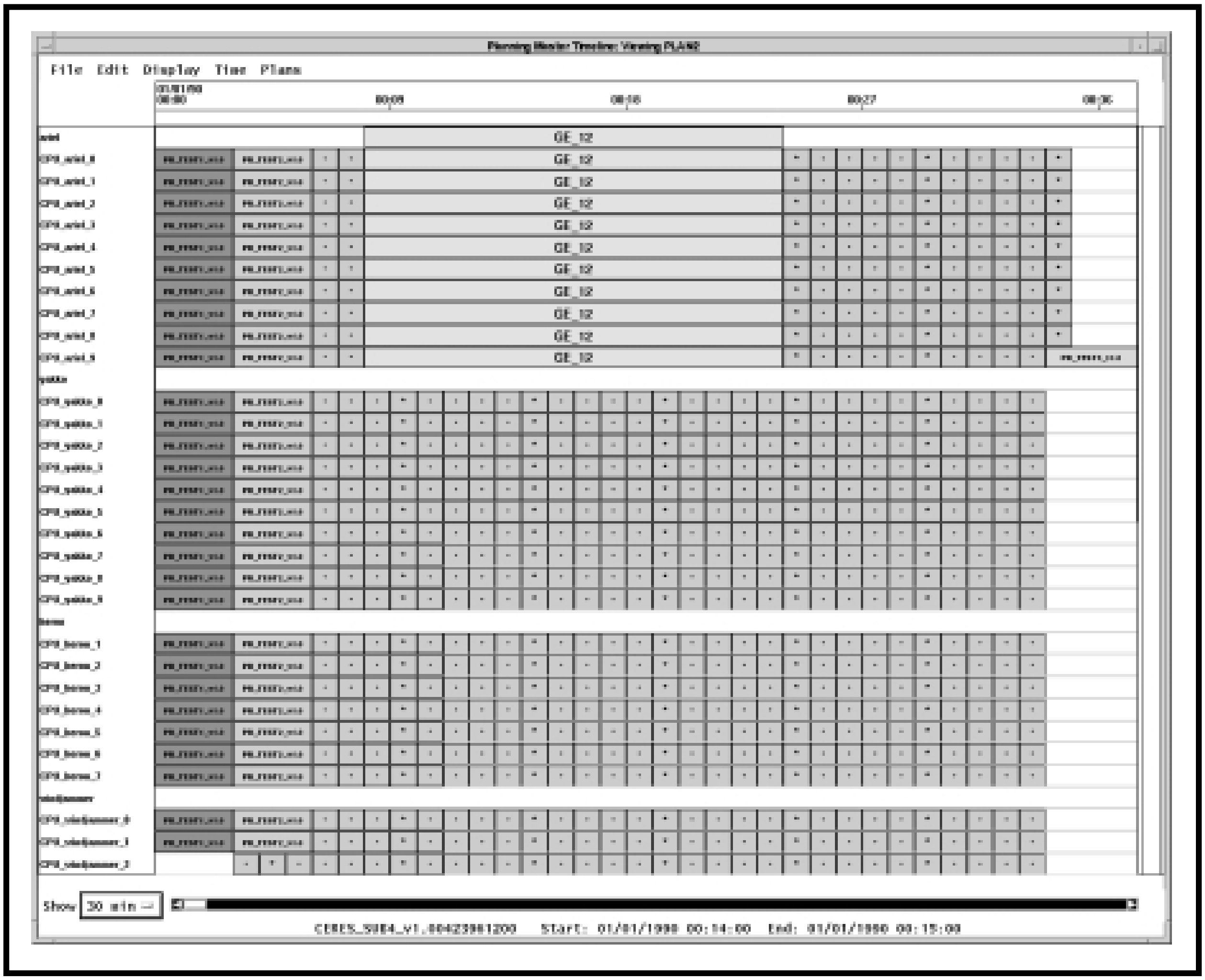

Figure 30. Production Planning Timeline GUI

- The **Message Handler** GUI displays messages of the following types:
  - Engineering.
  - Information.
  - Warning.
  - Internal.
- The **System Name Server** (SNS) handles interprocess communication.

- The **Resource Model** is an underlying resource data coordinator for the planning software.
- The ***ApplicationID*** is any number from 1 to 5. It identifies the message service in use so messages can be directed to the proper message handler GUI. Consequently, it is a good idea to use the same ApplicationID (also called MSGSRV_ID) consistently during a planning session.

10 Either click on the "minimize" icon in the upper right corner of the **Production Planning Timeline** GUI or adjust the window size and the view of the timeline as necessary using the mouse.

- Grab a corner of the timeline window with the cursor and resize the window as desired.

11 Open another UNIX window (if desired).

- It may be desirable to open the new UNIX window on another desktop if available.

12 Perform Steps 3 through 11 in the new UNIX window (if applicable).

13 Type **EcPlProdStratStart** ***MODE ApplicationID*** then press **Return/Enter** to launch the **Production Strategies** GUI.

- The **Production Strategies** GUI (Figure 31) is displayed.
- It is possible to start the **Production Strategies** GUI without first starting the Planning Workbench applications by skipping Steps 9 through 12.

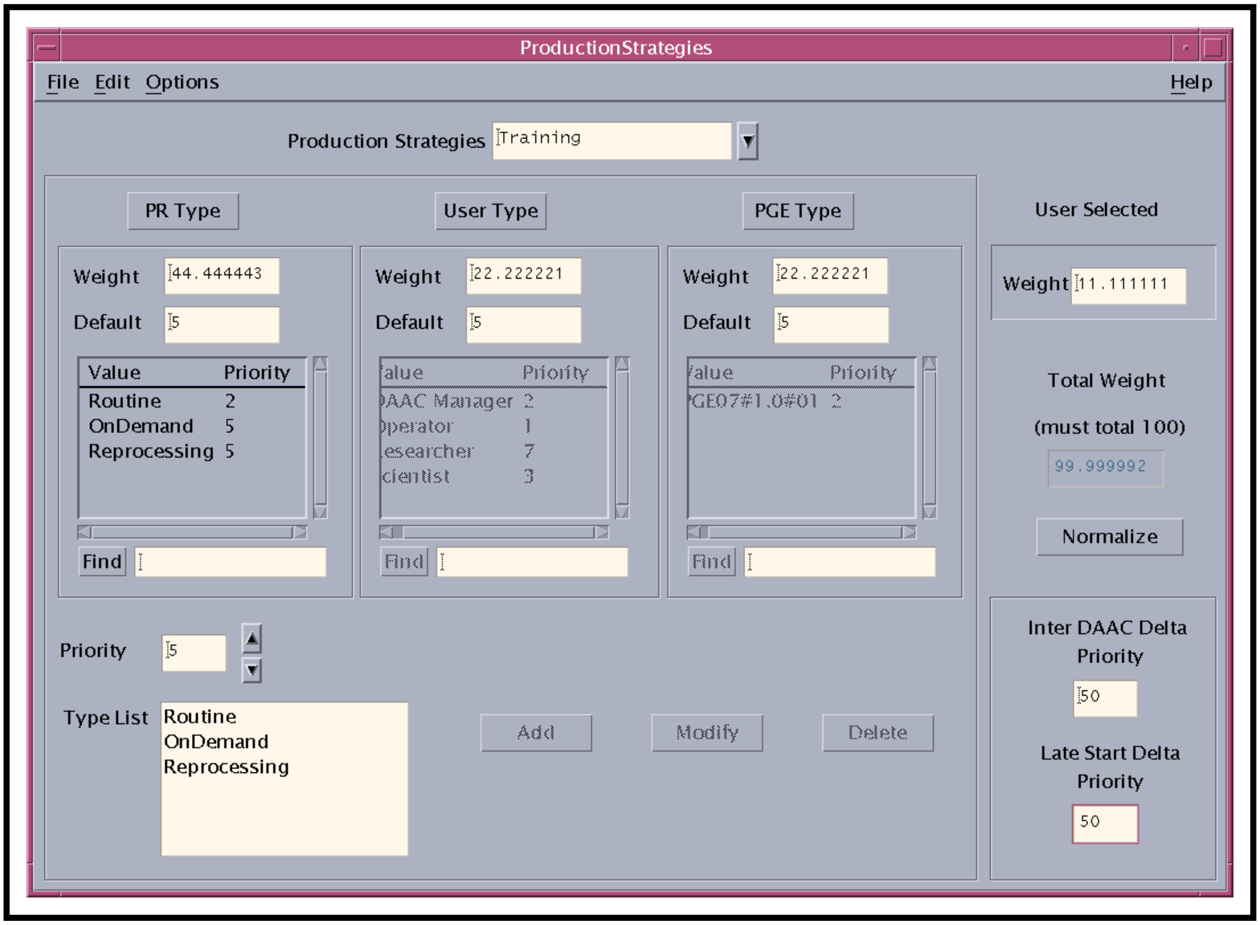

Figure 31. Production Strategies GUI

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Creating a New Production Plan

Production Plan

The Production Planner uses the Planning Workbench when creating a plan for production data processing at the DAAC. The Planning Workbench provides the means by which the Production Planner selects specific PRs whose DPRs are to be run. The planning tool provides a forecast of the start and completion times of the jobs based upon historical experience in running these PGEs. Through the planning tool, when the generated plan is “activated,” the information included in the plan is transferred to the Data Processing Subsystem and loaded into the Platinum AutoSys tool where production processing is managed. Figure 32 shows the general flow of production requests/data processing requests from the Production Request Editor through the Planning Workbench to the AutoSys production management tool.

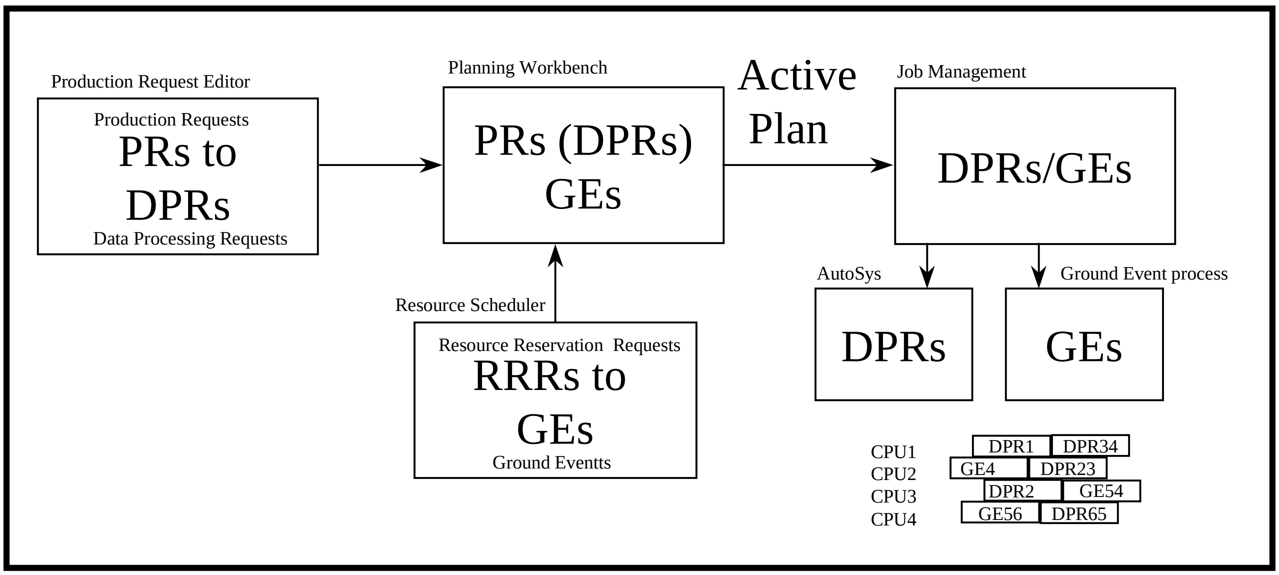

Figure 32. Planning Workbench Flow

The planning process involves the Production Planner preparing monthly and weekly production plans as well as a daily production schedule from the most current weekly plan. Although production planning varies from DAAC to DAAC, the following guidelines are generally applicable:

- Monthly plans
    - developed for the coming month and one or two months in advance.

— produced, reviewed, updated, published and distributed approximately two weeks before the beginning of the month.

— plan for the coming month is used to establish a baseline against which production targets can be measured.

- Weekly plans

  — produced, reviewed, updated, published and distributed approximately five days before the beginning of the coming week.

  — used to produce a baseline for comparison of planned vs. actual production results.

- Daily plan or schedule

  — produced each day for the next processing day.

  — developed from the current weekly plan, adjusted to reflect the actual processing accomplished and the actual resources available at the time the daily schedule is generated.

During normal processing, when reasonably accurate predictions of the processing time for the PGEs are available, the processing schedule should result in a reasonably accurate prediction of when data products will be generated. However, during abnormal situations (e.g., equipment failure), what is actually accomplished could depart significantly from the plan. In such situations, the Production Planner may choose to develop new plans to reflect current events. This process is known as "replanning."

Production Strategy

A Production Strategy is a high-level plan that the Production Planner prepares to notify the Planning Workbench of the rules for priorities and preferences in the processing of DPRs. Production Strategies work on two levels. First, the Production Planner can update lists of DPR attributes so that each value an attribute can have is tied to a particular priority. For example, the DPR attribute "PR Type" has three values that may have their default priority of 2 changed as follows (on a scale of 1 to 10):

- Routine 6
- On-Demand 10
- Reprocessing 4

Next, the Production Planner can change the weight that each attribute's priority is given. For example, weights (from 1 to 100) might be assigned to the DPR attributes as follows:

- PR Type 45
- User Type 15
- PGE Type 20

A weight is also given to the priority specified when the user (e.g., the Production Planner) created the Production Request as shown in the following example:

- User Selected 20

The total weights assigned to PR Type, User Type, PGE Type and User Selected must equal 100. Using the data entered by the operator the Planning Workbench calculates a priority for each DPR in a Production Plan. Figure 33 provides an illustration of how priority is calculated for a DPR.

Finally, there are deltas that can be added to the calculated priority based on two types of conditions. Specifically, a Production Planner may choose to increase the priority of all jobs that produce data needed by other DAACs (the Inter-DAAC Delta) or that have been waiting in the Production Queue for more than a day (the Late Start Delta).

Defining a Production Strategy

The Production Planner uses the Production Strategies GUI to develop Production Strategies. The procedure that follows describes how to define or modify a Production Strategy.

The procedure for defining a production strategy starts with the assumption that all applicable servers are currently running and the **Production Strategies** GUI (Figure 31) is being displayed.

Defining a Production Strategy

---

1 If defining a new production strategy, select **File → New** from the pull-down menu.

- The fields of the **Production Strategies** GUI (Figure 31) are reset.

2 If modifying an existing production strategy, first click on the option button associated with the **Production Strategies** field, then highlight (in the option menu) the name of the production strategy to be modified.

- Data pertaining to the selected production strategy are displayed in the applicable fields of the **Production Strategies** GUI (Figure 31).
- Alternatively, it is possible to select **File → Open** from the pull-down menu, select the desired production strategy from the list on the **Open** window, and click on the **Ok** button to open the production strategy.

3 If changing the default priority for PR Type, click in the **Default** field below the **PR Type** button and type the desired default value.

- The range for the default is from 1 to 10.

4 If changing the default priority for User Type, click in the **Default** field below the **User Type** button and type the desired default value.

5 If changing the default priority for PGE Type, click in the **Default** field below the **PGE Type** button and type the desired default value.

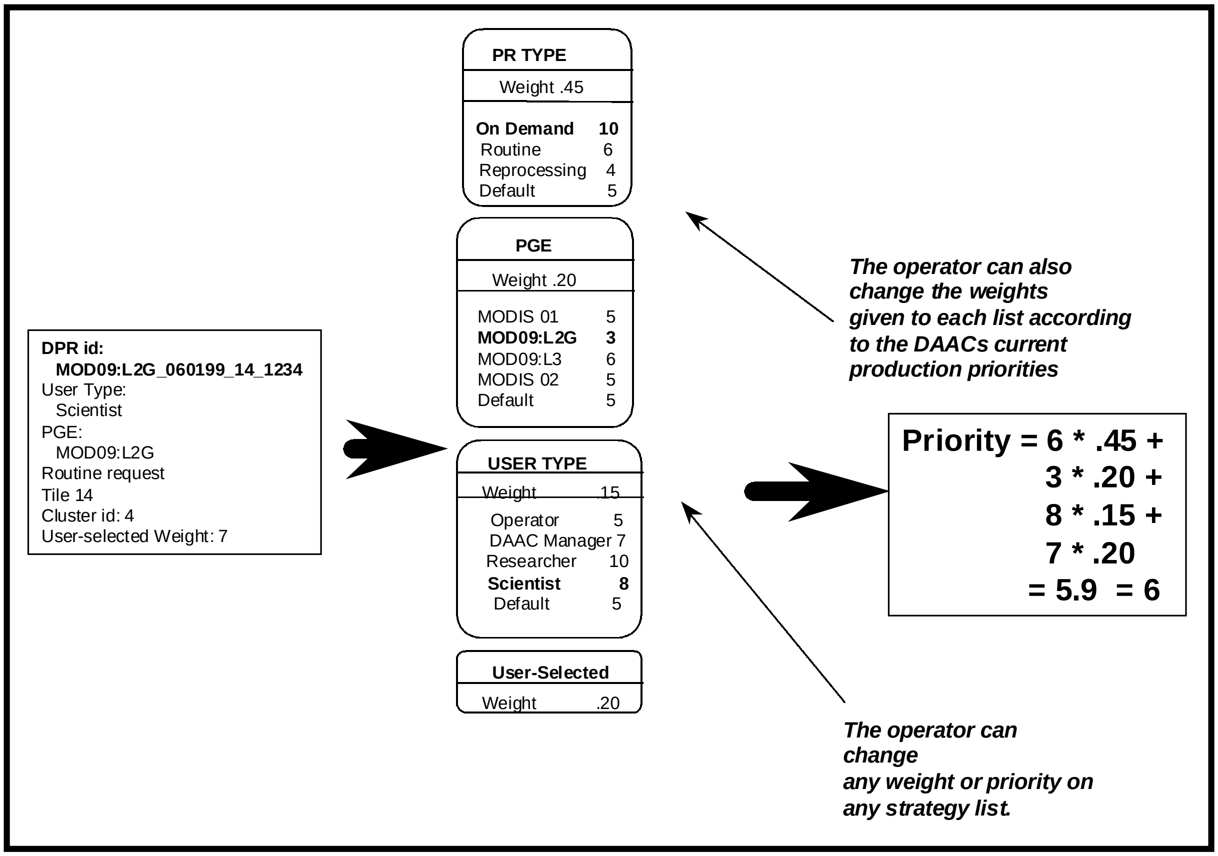

Figure 33. Example of Calculating Priority for a DPR

6 If defining or modifying a priority for a type of production request, first click on the **PR Type** button.

- The different types of production requests are displayed in the **Type List** field at the bottom left of the GUI.

7 If defining a priority for a type of production request **not** currently listed in the **PR Type Value-Priority** list, click on that PR type in the **Type List** field.

- The PR type is highlighted.
- It is possible to highlight multiple PR types (by clicking on each one in turn) if they are all going to be assigned the same priority.

8 If redefining or deleting a priority for a type of production request **already** listed in the **PR Type Value-Priority** list, click on that PR type in the **Value-Priority** list.

- The PR type is highlighted.

- It is possible to highlight multiple PR types (by clicking on each one in turn while holding down either the **Shift** key or the **Ctrl** key) if the same action is going to be taken with respect to all of them.

9 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.

- An alternative method of entering the priority is to type the desired priority value in the **Priority** field.
- The acceptable range for the priority is from 1 to 10.

10 Click on the appropriate button from the following selections:

- **Add** - to approve a priority for an additional PR type and display the selected PR type and priority in the **PR Type Value-Priority** list at the left center of the GUI.
- **Modify** - to approve a revised priority for the selected PR type and display the PR type and modified priority in the **PR Type Value-Priority** list.
- **Delete -** to delete the priority for the selected PR type and remove the PR type and priority from the **PR Type Value-Priority** list.

11 Repeat Steps 6 through 10 as necessary until all PR Type priorities (as shown in the **PR Type Value-Priority** field) are correct.

12 If defining or modifying a priority for a type of user, first click on the **User Type** button.

- The different types of users are displayed in the **Type List** field at the bottom left of the GUI.

13 If defining a priority for a type of user **not** currently listed in the **User Type Value-Priority** list, click on that user type in the **Type List** field.

- The user type is highlighted.
- It is possible to highlight multiple user types (by clicking on each one in turn).

14 If redefining or deleting a priority for a user type **already** listed in the **User Type Value-Priority** list, click on that user type in the **Value-Priority** list.

- The user type is highlighted.
- It is possible to highlight multiple user types (by clicking on each one in turn while holding down either the **Shift** key or the **Ctrl** key).

15 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.

- An alternative method of entering the priority is to type the desired priority value in the **Priority** field.

- The acceptable range for the priority is from 1 to 10.

16 Click on the appropriate button from the following selections:

- **Add** - to approve a priority for an additional user type and display the selected user type and priority in the **User Type Value-Priority** list near the center of the GUI.
- **Modify** - to approve a revised priority for the selected user type and display the user type and modified priority in the **User Type Value-Priority** list.
- **Delete** - to delete the priority for the selected user type and remove the user type and priority from the **User Type Value-Priority** list.

17 Repeat Steps 12 through 16 as necessary until all user type priorities (as shown in the **User Type Value-Priority** field) are correct.

18 If defining a priority for a type of PGE, first click on the **PGE Type** button.

- The different types of PGEs are displayed in the **Type List** field at the bottom left of the GUI.

19 If defining a priority for a type of PGE **not** currently listed in the **PGE Type Value-Priority** list, click on that PGE type in the **Type List** field.

- The PGE type is highlighted.
- It is possible to highlight multiple PGE types (by clicking on each one in turn).

20 If redefining or deleting a priority for a PGE type **already** listed in the **PGE Type Value-Priority** list, click on that PGE type in the **Value-Priority** list.

- The PGE type is highlighted.
- It is possible to highlight multiple PGE types (by clicking on each one in turn while holding down either the **Shift** key or the **Ctrl** key).

21 If defining or modifying (not deleting) a priority, click on the up/down arrow buttons to the right of the **Priority** field until the desired priority value is displayed in the **Priority** field.

- An alternative method of entering the priority is to type the desired priority value in the **Priority** field.
- The acceptable range for the priority is from 1 to 10.

22 Click on the appropriate button from the following selections:

- **Add** - to approve a priority for an additional PGE type and display the selected PGE type and priority in the **PGE Type Value-Priority** list near the center of the GUI.
- **Modify** - to approve a revised priority for the selected PGE type and display the PGE type and modified priority in the **PGE Type Value-Priority** list.

- **Delete -** to delete the priority for the selected PGE type and remove the PGE type and priority from the **PGE Type Value-Priority** list.

23 Repeat Steps 18 through 22 as necessary until all PGE type priorities (as shown in the **PGE Type Value-Priority** field) are correct.

24 Click in the **Weight** field below the **PR Type** button and type the desired weight.

- The acceptable range for weights is from 1 to 100.
- The **Total Weight** field displays updated totals of all weighting factors as they are entered.
- When entering weights for the PR Type, User Type, PGE Type, and User Selected factors, relative values can be typed in without regard to whether the values in the four categories add up to 100. The **Normalize** button provides a means of eventually ensuring that the total of all four categories equals 100.
- The assigned weight in each category is multiplied by the priority for each type. To maintain a high priority (low number, such as one), assign a low weight; to ensure a low priority, assign a relatively high weight.

25 Click in the **Weight** field below the **User Type** button and type the desired weight.

26 Click in the **Weight** field below the **PGE Type** button and type the desired weight.

27 Click in the **User Selected Weight** field and type the desired weight.

- The priority to which the user-selected weight is applied is the priority assigned using the Production Request Editor when a production request is created.

28 Click on the **Normalize** button.

- The Planning Subsystem adjusts all weighting factors to produce a total weight of 100 (as displayed in the **Total Weight** field).

29 If it is necessary to change the priority of all jobs that produce data needed by other DAACs, click in the **Inter DAAC Delta Priority** field and type the desired value.

- The range for Inter-DAAC Delta Priority is from 1 to 100.
- The lower the number, the higher the priority (1 is a high priority, 100 is a low priority).

30 If it is necessary to change the priority of jobs that have been waiting in the Production Queue for more than a day, click in the **Late Start Delta Priority** field and type the desired value.

- The range for the Late Start Delta Priority is from 1 to 100.

31 Select **File → Save As** from the pull-down menu.

- A **Save As** window similar to the **File Selection** windows in Figures 22 and 27 is displayed.

32 Type the desired file name for the new production strategy in the **Save As** field.

33 Click on the **Ok** button to accept the file name in the **Save As** field.

- The **Save As** window is dismissed.
- The production strategy is saved with the specified file name.

34 To exit from the **Production Strategies** GUI select **File → Exit** from the pull-down menu.

Creating a New Production Plan

The Production Planner creates a production plan by selecting PRs from two lists of PRs, i.e., the list of available "Unscheduled" PRs and the list of "Scheduled" PRs. Using arrow buttons, the Production Planner moves the PRs between lists until the "Scheduled" list contains the desired set of PRs that define the new plan.

Before creating a new production plan the Production Planner must be prepared to provide the following information:

- Name of the plan.
- PRs to be included in the new production plan.
- Comments (if any).

The Production Planner uses the Planning Workbench GUI to prepare Production Plans. The procedure that follows describes how to create a new Production Plan. The procedure starts with the assumption that all applicable servers are currently running and the **Planning Workbench** GUI (Figure 29) is being displayed.

Creating a New Production Plan

1 Select **File → New** on the **Planning Workbench GUI**.

- The **New Plan** window (Figure 34) is displayed.

2 Type the ***Plan Name*** in the **Plan Name** field.

- Name is displayed in **Plan Name** field.
- Status is **Candidate**.

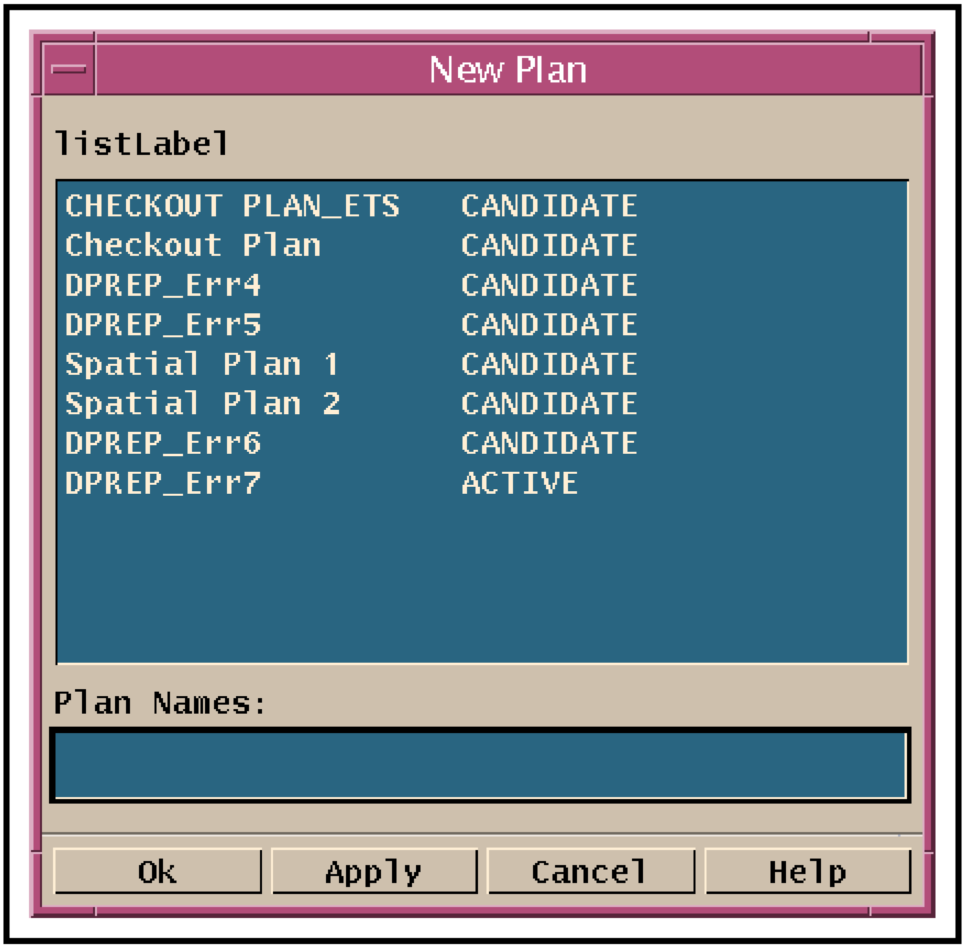

Figure 34. Planning Workbench New Plan Window

3 Click on the **Ok** button.

- The **New Plan** window is dismissed.

4 If applicable, click on the option button associated with the **Strategy** field, then highlight the desired production strategy in the option menu.

5 Move PRs between the **Unscheduled** and **Scheduled** lists as necessary by selecting (highlighting) the PR to be moved by clicking on the PR in the list from which it is to be moved then clicking on the up or down arrow button (as applicable) to move the PR to the other list.

- Highlighted PR disappears from one list and appears on the other.
- The **Unscheduled** and **Scheduled** PR lists are scrollable.

- In the **Scheduled** list, items with the prefix “GE_” are resource reservations (also called “ground events”).
  - Ground events are resource reservations for non-production-related purposes, including such activities as testing, preventive maintenance, or system upgrades.
  - Ground events are scheduled through the resource planning process.
- If processing of the currently active plan is to be continued when the new plan is activated, include the PR(s) for the currently active plan in the new plan.

6 Type any relevant comments (up to 255 characters) in the **Comments** field.

7 Select **File → Save As** from the pull-down menu.

- The **Save Plan** window is displayed.
- Except for the title, the **Save Plan** window looks the same as the **New Plan** window (Figure 34).

8 Type the ***Plan Name*** for the production plan in the **Plan Names** field.

9 Click on the **OK** button to accept the file name in the **Plan Names** field.

- The **Save Plan** window is dismissed.
- The production plan is saved with the specified file name.
- The **Planning Workbench** GUI (Figure 29) is displayed.
- The **Plan Name** is displayed.
- The **Status** displayed is **Candidate**.

10 If the new plan is to be activated immediately, click on the **Activate** button.

- The new plan is activated.
- The time of plan activation is displayed next to **Rollover Time:** on the **Planning Workbench** GUI.

11 If the production plan is to be used as a baseline plan, perform Steps 12 through 15; otherwise, go to Step 16.

12 Click on the **Baseline** button.

13 Select **File → Save As** from the pull-down menu.

- The **Save Plan** window is displayed.

14 Type the desired file name for the new production plan in the **Plan Names** field.

15 Click on the **OK** button to accept the file name in the **Plan Names** field.

- The **Save Plan** window is dismissed.

- The production plan is saved with the specified file name.
- The **Planning Workbench** GUI (Figure 29) is displayed.
- The **Plan Name** is displayed.
- The **Status** displayed is **Baseline**.

16 Repeat Steps 1 through 15 to perform additional production planning activities.

17 To quit the **Planning Workbench** GUI when production planning is complete select **File → Exit**.

18 After quitting the **Planning Workbench** GUI click in the UNIX window used to start the **Planning Workbench** GUI.

- The Message Handler, System Name Server, and Resource Model should be shut down to eliminate unneeded processes and allow other operators to gain access to the Planning Workbench if necessary.

19 Type **EcPlSlayAll *MODE ApplicationID*** then press **Return/Enter** to shut down the Planning Timeline, Message Handler, System Name Server, and Resource Model (and the Planning Workbench if it has not already been shut down).

- The **Message Handler** GUI (Figure 28) disappears.

20 Type **ps -ef | grep *MODE*** then press **Return/Enter** to obtain a list of active processes in the specified mode.

- A list of active processes in the specified mode is displayed.
- If an error message is received when **ps -ef | grep *MODE*** is entered, type **ps -auxwww | grep *MODE*** then press **Return/Enter**.

21 Examine the list of processes running in the specified mode to determine whether the Message Handler, System Name Server, and Resource Model processes have actually been shut down.

- None of the following processes should be active:
  - EcPlWb
  - EcPlTl
  - EcPlMsh
  - EcPlSns
  - EcPlRm

22 If any of the specified processes [especially the Message Handler, System Name Server, and/or Resource Model process(es)] is/are still active, type **kill -15 *process_id1 [process_id2] [process_id3] […]*** to terminate the active process(es).

23 Repeat Steps 20 through 22 as necessary.

Reviewing a Plan Timeline

It is possible to display a graphic, timeline-oriented depiction of a production plan, as shown in Figure 30. The timeline application becomes available when the Production Planning Workbench is initiated. The display shows a set of processing equipment, arranged along the left side of the GUI, and some period of time as indicated across the top edge of the GUI.

The execution of DPRs on the processing equipment over a period of time is represented by several DPR bars across the GUI for that equipment. In addition, there may be bars that represent resource reservations for non-production-related purposes, which are also called "ground events." They are scheduled through the resource planning process. Ground events include such activities as testing, preventive maintenance, or system upgrades.

- A bar represents a time period during which a DPR is to be processed or a resource reservation has been planned.
- Each bar bears the name of a DPR or a resource reservation. Given the selection of a light enough color for the bar and a time span that allows a long enough bar, the name of the DPR or resource reservation can be seen on the bar.
  - Placing the cursor on a bar causes the name of the DPR (or resource reservation), its description, and its start and end dates/times to appear near the bottom of the timeline GUI.
  - Resource reservations are identified by the prefix "GE_".

The procedure for reviewing a production plan timeline starts with the assumption that all applicable production planning servers are running and the **Production Planning Timeline** GUI (Figure 30) is being displayed.

Reviewing a Plan Timeline

1 Adjust the **Production Planning Timeline** window size and the view of the timeline as necessary using the mouse.

- Grab a corner of the timeline window with the cursor and resize the window as desired.
- Scroll up or down through the full list of equipment.
- Scroll left or right to go backward or forward in time.

2 If a different plan is to be viewed (other than the one currently being displayed), select **File → Open Plan** from the pull-down menu.

- The **Open Plan** window (Figure 35) is displayed.

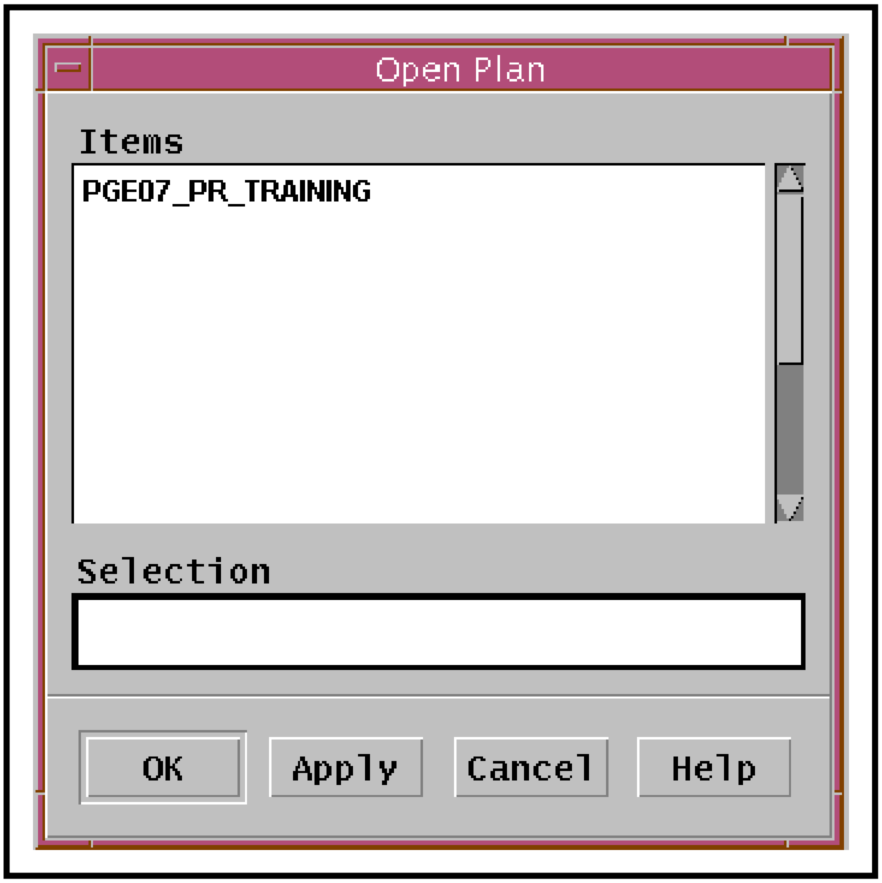

Figure 35. Open Plan Window

- The available plans are listed.

3 Select (highlight) the plan to be reviewed by clicking on the corresponding plan name in the list of plans.

4 Click on the **OK** button.

- The selected plan is displayed on the **Production Planning Timeline**.

5 If a different time scale (start and end dates and times) is desired, perform Steps 6 through 8; otherwise, go to Step 9.

6 Select **Time** → **Change Plan Window** from the pull-down menu:

- The **plan window edit** window (Figure 36) is displayed.

7 Type date and time for the desired start and end times (in ***DD MMM YYYY hh:mm:ss*** format) in the **Plan Win Start** and **Plan Win End** fields of the **plan window edit** window.

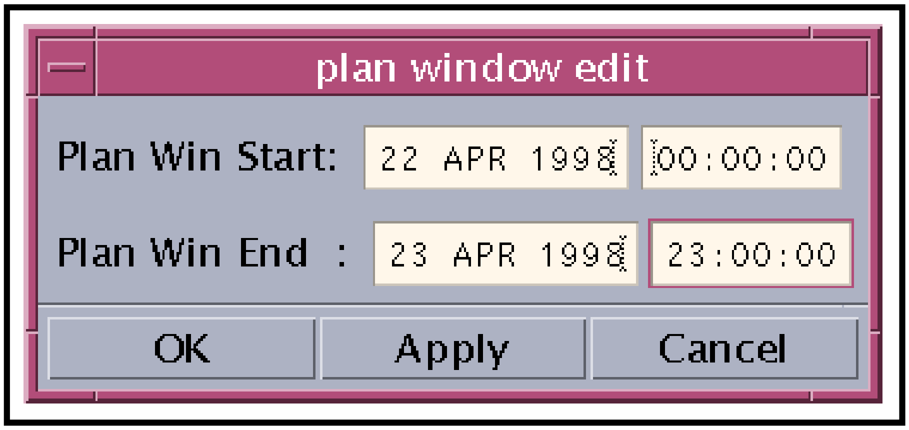

Figure 36. Plan Window Edit Window

8 When the appropriate date and time have been entered, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **plan window edit** window.
- **Apply** - to accept the changes without dismissing the **plan window edit** window.
- **Cancel** - to cancel the changes and dismiss the **plan window edit** window.

9 If a different time span is desired, click and hold on the **Show** option button and select (highlight then release the mouse button) the desired time span from the option menu that is displayed:

- **5 min**
- **10 min**
- **30 min**
- **45 min**
- **1 hr**
- **2 hr**
- **4 hr**
- **6 hr**
- **12 hr**
- **24 hr**
- **168 hr**
- **other**

10 If no resources are displayed on the GUI or if different resources should be displayed, perform Steps 11 through 15; otherwise, go to Step 16.

11 Select **Display** → **Change resources** from the pull-down menu:

- The **Resource edit** window (Figure 37) is displayed.

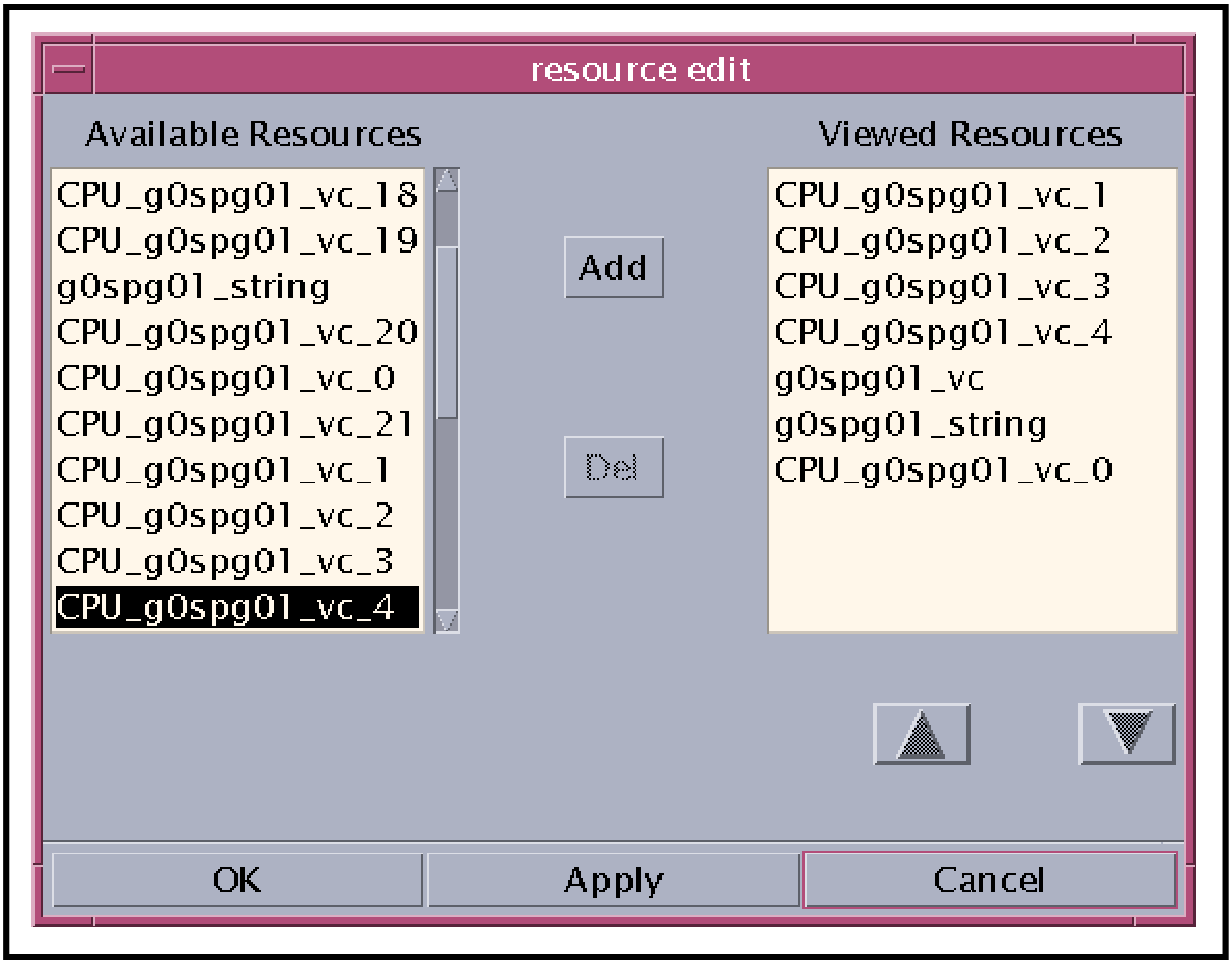

Figure 37. Resource Edit Window

12 If adding resource(s) from the **Available Resources** list to the **Viewed Resources** list, select (highlight) the resource(s) to be added, then click on the **Add** button to move the resource(s) to the **Viewed Resources** list.

- Highlighted resource(s) appear(s) on the **Viewed Resources** list.

13 If deleting resource(s) from the **Viewed Resources** list, select (highlight) the resource(s) to be removed, then click on the **Del** button to remove the resource(s) from the **Viewed Resources** list.

- Highlighted resource(s) disappear(s) from the **Viewed Resources** list.

14 If changing the order in which resources are listed in the **Viewed Resources** list, select (highlight) the resource to be moved, then click on the up or down arrow as necessary to reposition the selected resource.

- Highlighted resource changes position in the **Viewed Resources** list.

15 When the **Viewed Resources** list contains the desired set of resources, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **Resource edit** window.
- **Apply** - to accept the changes without dismissing the **Resource edit** window.
- **Cancel** - to cancel the changes and dismiss the **Resource edit** window.

16 If different color coding of the timeline is desired, perform Steps 17 through 21; otherwise, go to Step 22.

17 Select **Display** → **Change colors** from the pull-down menu:

- The Color Selections window (Figure 38) is displayed.

18 Click on the name of one of the DPRs or resource reservations to be recolored.

- The DPR or resource reservation is highlighted.

19 Click on the desired color (in the color palette) to be applied to the highlighted DPR or resource reservation.

20 Repeat Steps 18 and 19 as necessary.

21 When the appropriate color changes have been made, click on the appropriate button from the following selections:

- **OK** - to accept the changes and dismiss the **Color Selections** window.
- **Apply** - to accept the changes without dismissing the **Color Selections** window.
- **Cancel** - to cancel the changes and dismiss the **Color Selections** window.

22 Observe the production scheduling information displayed on the **Production Planning Timeline** GUI.

23 Repeat the previous steps as necessary.

24 If it becomes necessary to exit from the timeline GUI, select **Close** from the window manager pull-down menu (upper left-hand corner of the GUI).

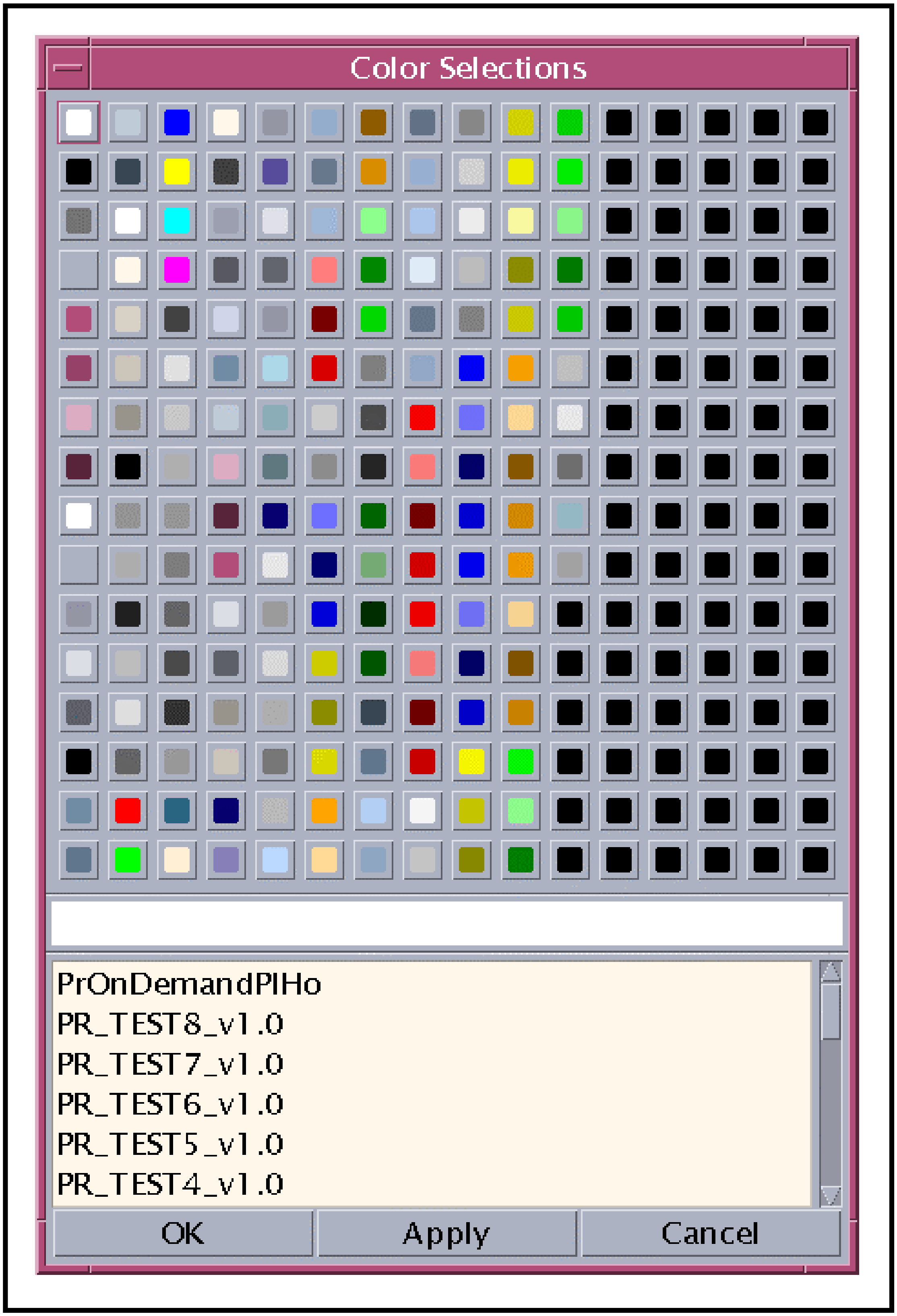

Figure 38. Color Selections Window

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Troubleshooting Production Planning Problems

Trouble Symptoms

Troubleshooting is a process of identifying the source of problems on the basis of observed trouble symptoms. One common source of problems involves connections with other subsystems for the transmission of messages or data. Like many other operational areas in ECS, Planning has interfaces with many other subsystems. Consequently, problems with processing can be traced to either the Planning Subsystem or one of many other ECS subsystems, including (but not necessarily limited to) those in the following list:

- Data Processing Subsystem (DPS).
- Data Server Subsystem (DSS).
- Interoperability Subsystem (IOS).
- Communications Subsystem (CSS).

Table 1 describes actions to be taken in response to some common Planning problems. If the problem cannot be identified and fixed without help within a reasonable period of time, the appropriate response is to call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 1. Troubleshooting Production Planning Problems

Symptom	Response
Unable to log in to the Planning Subsystem host (e.g., g0pls01).	Check with the Operations Controller/System Administrator to ensure that the host is “up."
GUI not displayed when the start-up script has been properly invoked.	1. Ensure that the DISPLAY variable was set properly. 2. Ensure that the xhost command was given on the initial login host. [For detailed instructions refer to the applicable procedure, either **Launching the Production Request Editor** or **Launching Planning Workbench-Related GUIs** (previous sections of this lesson).]
Error message indicating that SNS (System Name Server) and/or Resource Model is/are in use using the selected Application ID.	1. Use another Application ID if working in a different mode from the person using the selected Application ID. 2. If working in the same mode as the other user, coordinate use of Planning applications with the other user and/or the System Administrator. [For detailed instructions refer to the procedure for **Launching Planning Workbench-Related GUIs** (previous section of this lesson).]

Table 1. Troubleshooting Production Planning Problems

Symptom	Response
Error message associated with the Production Request Editor.	Refer to Table 2, Production Request Editor User Messages (adapted from the corresponding table in 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*).
Error message associated with the Production Strategies GUI.	Refer to Table 3, Production Strategy User Messages (adapted from the corresponding table in 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*).
Error message associated with the Planning Workbench.	Refer to Table 4, Planning Workbench User Messages (adapted from the corresponding table in 609-CD-500-001, *Release 5A Operations Tools Manual for the ECS Project*).
DPR generation fails.	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” check the log files (e.g., EcPlPREditor.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the section on **Handling a Failure to Generate DPRs** (subsequent section of this lesson).] 4. Retry generating DPRs by resaving the Production Request. [For detailed instructions refer to the section on **Editing/Modifying a Production Request** (previous section of this lesson).]
DPR scheduling fails (DPR is not passed to Data Processing).	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” check the log files (e.g., EcPlWb.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the section on **Handling a DPR Scheduling Failure** (subsequent section of this lesson).] 4. Retry activating the Production Plan. [For detailed instructions refer to the section on **Creating a New Production Plan** (previous section of this lesson).]
Other problems.	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” check the log files (e.g., EcPlPREditor.ALOG, EcPlWb.ALOG, EcPlTl.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]

Table 2. Production Request Editor User Messages

Message Text	Cause and Corrective Action
Data Processing Request not open, Data Processing Request to be open must be selected.	1. Select (highlight) a DPR from the DPR List. 2. Open the DPR using **File** → **Open** from the pull-down menu. [For detailed instructions refer to the procedure for **Reviewing Data Processing Requests** (previous section of this lesson).]
Do you want to delete this DPR "DPRID"?	1. Select **Yes** to delete the DPR. 2. Select **No** to keep the DPR.
Do you want to delete this PR "PRNAME"?	1. Select **Yes** to delete the PR. 2. Select **No** to keep the PR.
DPR Delete Failed.	Check the log files (e.g., EcPlPREditor.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]
Dpr Generation Incomplete for PR "PRNAME". Do you want to complete Dpr explosion?	1. Select **Yes** to complete the DPR generation. 2. Select **No** to display another message that will show how many DPRs have been generated so far.
Environment variable PL_NEW not set.	1. Use one of the UNIX text editors or viewing tools to check the EcPlPREditor.CFG file in the /usr/ecs/*MODE*/CUSTOM/cfg directory for the **Pl_New** value. 2. If no value is specified for **PL_NEW**, add the line **PL_New = New** to the EcPlPREditor.CFG file using one of the UNIX text editors.
Invalid Time is entered or End time is less than Begin Time.	Ensure that the **Begin** and **End** dates/times entered on the **PR Edit** screen are valid.
Must select a PGE for Production Request before saving.	1. Open the **PGE** screen by clicking the mouse on the **PGE** button of the **PR Edit** screen. 2. Select (highlight) a PGE from the PGE list. 3. Click on the **OK** button.
MyDprPlProductionRequest Construct from Database Failed.	Call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
MyPlPge Construct from Database Failed.	Call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
MyPlProductionRequestInstance Construct from Database Failed.	Call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
MyPlUserParametersCollection Construct from Database Failed.	Call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 2. Production Request Editor User Messages

Message Text	Cause and Corrective Action
“NoOfDprs" Dpr(s) have previously been generated. Are you sure you want to delete this PR?	1. Select **Yes** to delete the PR. 2. Select **No** to clear the message.
PlDpr Construct from Database Failed.	1. Select (highlight) a DPR from the DPR List. 2. Open the DPR using either **File** → **Open** from the pull-down menu or the keyboard **Ctrl-O**. [For detailed instructions refer to the procedure for **Reviewing Data Processing Requests** (previous section of this lesson).]
Please select a Dpr you want to delete from the DPR List.	1. Select (highlight) a DPR from the DPR List. 2. Delete the DPR using either **Edit** → **Delete** from the pull-down menu or the keyboard **Ctrl-D**. [For detailed instructions refer to the procedure for **Deleting a Data Processing Request** (previous section of this lesson).]
Please select a PR you want to delete from the PR List.	1. Select a PR from the PR List. 2. Delete the PR using either **Edit** → **Delete** from the pull-down menu or the keyboard **Ctrl-D**. [For detailed instructions refer to the procedure for **Deleting a Production Request** (previous section of this lesson).]
Please specify production request to filter by	The **Filter** button (**File Selection** window) acts on the pattern specified in the **Filter** text entry area. (Filters all production requests by the specified pattern.) 1. Type text (the pattern for filtering production requests) in the **Filter** text entry area. 2. Click on the **Filter** button.
PR Failed - Need to include 1st orbit in the Orbit model.	1. Enter isql commands for checking the PDPS database PlPgeOrbitModel table to determine whether the orbit information for the first orbit is in the table. [For detailed instructions refer to the procedure for **Using ISQL to Check Database Tables** (subsequent section of this lesson).] 2. If the orbit information for the first orbit is not in the PlPgeOrbitModel table, notify the SSI&T team.
PR Failed - Read failure from PlOrbitModel.	Unable to read the PlPgeOrbitModel table from the PDPS database. 1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 2. Production Request Editor User Messages

Message Text	Cause and Corrective Action
Production Request "PRNAME" Deleted; "NoOfDprs" DPR(s) deleted from the database.	For information only. The message indicates how many DPR’s associated with the PR were deleted.
Production Request Delete Failed.	Unable to delete a PR from the database. Check the EcPlPREditor.ALOG file in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]
Production Request Explosion into DPR(s) Failed.	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” check the log files (e.g., EcPlPREditor.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the section on **Handling a Failure to Generate DPRs** (subsequent section of this lesson).] 4. Retry generating DPRs by resaving the Production Request. [For detailed instructions refer to the section on **Editing/Modifying a Production Request** (previous section of this lesson).]
Production Request Explosion into DPRs Failed, zero DPRs Generated.	Same as the preceding entry.
Production Request Explosion into DPRs ok. "NoOfDprs" DPR(s) Generated.	For information only. The message indicates how many DPR(s) were generated during the PR Explosion.
Production Request Explosion into DPR(s) ok. "NoOfDprs" more DPR(s) Generated.	For information only. The message indicates how many more DPR’s were generated for the PR.
Production Request not open, Production Request to be open must be selected.	1. Select a PR from the PR List. 2. Open the PR using either **File** → **Open** from the pull-down menu or the keyboard **Ctrl-O**. [For detailed instructions refer to the procedure for **Editing/Modifying a Production Request** (previous section of this lesson).]
Production Request not saved, Production Request already exists.	1. Enter a new name for the production request. 2. Save the PR. [For detailed instructions refer to the procedure for **Editing/Modifying a Production Request** (previous section of this lesson).]

Table 2. Production Request Editor User Messages

Message Text	Cause and Corrective Action
Production Request not saved, Production Request must have a name shorter than 20 characters before its saved	1. Enter a PR name with fewer than 20 characters. 2. Save the PR. [For detailed instructions refer to the procedure for **Editing/Modifying a Production Request** (previous section of this lesson).]
Production Request not saved, Production Request must have a name before its saved.	1. Enter a new name for the production request. 2. Save the PR. [For detailed instructions refer to the procedure for **Creating a New Production Request** (previous section of this lesson).]
Production Request not saved, save Production Request first.	Save the modified PR before opening a new PR. [For detailed instructions refer to the procedure for **Editing/Modifying a Production Request** (previous section of this lesson).]
SECURITY VIOLATION: no write permission.	User does not have the permission to save a production request. 1. Exit from the Production Request Editor (**File** → **Exit** from the pull-down menu). 2. Log in as a user with write permission. [Contact the System Administrator for assistance if necessary.] 3. Launch the Production Request Editor. [For detailed instructions refer to the procedure for **Launching the Production Request Editor** (previous section of this lesson).] 4. Create the Production Request. [For detailed instructions refer to the procedure for **Creating a New Production Request** (previous section of this lesson).]
Unable to Initialize PlDpr Pool.	Unable to read the DPR table from the database. 1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Unable to Initialize PlPge Pool.	Unable to read the PGE table from the database. 1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

__Table 2. Production Request Editor User Messages__

Message Text	Cause and Corrective Action
Unable to Initialize PlProductionRequest Pool.	Unable to read the PR table from the database. 1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Write to Database of Production Request Failed.	Unable to write the data to the database. 1. Check the database connections. [For detailed instructions refer to the procedure for **Checking Database Connections** (subsequent section of this lesson).] 2. If the problem recurs, call the help desk and submit a trouble ticket in accordance with site Problem Management policy.
Zero DPR Generated. Production Request Not Saved.	The proposed Production Request might result in the creation of a duplicate DPR. 1. Compare the characteristics of the proposed PR and existing DPRs to determine whether the Production Request would result in the creation of a duplicate DPR. [For detailed instructions refer to the procedure for **Reviewing Data Processing Requests** (previous section of this lesson).] 2. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are “up.” 3. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 4. If hosts/servers are all “up,” check the log files (e.g., EcPlPREditor.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the section on **Handling a Failure to Generate DPRs** (subsequent section of this lesson).] 5. Retry generating DPRs by resaving the Production Request. [For detailed instructions refer to the section on **Editing/Modifying a Production Request** (previous section of this lesson).]

Table 3. Production Strategy User Messages

Message Text	Cause and Corrective Action
Invalid StrategyID. Please enter a StrategyID.	Enter a valid Strategy ID. [For detailed instructions refer to the procedure for **Defining a Production Strategy** (subsequent section of this lesson).]
No StrategyID selected. Please select one.	Select a Strategy ID from the list.
This StrategyID already exists.	Enter a new name for the Strategy ID.
Total Weight must be 100 – Normalize weights.	Click on the **Normalize** push button.
Value out of range (0-10).	Enter a value in the range of 0 – 10.
Value out of range (0-100).	Enter a value in the range of 0 – 100.

Table 4. Planning Workbench User Messages

Message Text	Cause and Corrective Action
Date entered ‘date that was entered’ is invalid.	Improper date format. Enter the date in **mm/dd/yyyy** format.
Start Time must be less than Stop Time	Improper time interval setting for plan activation. Enter a start time that is earlier than the stop time.
The following dpr jobs were failed when you activated the plan <plan name> <list of failed dprs, one per line> Do you want to recover the failed dpr jobs?	Planning Workbench detects that JobManagement has not received the DPRs correctly. The operator needs to be aware that there is (are) failed job(s). Click on **Recover**; the failed jobs will be resubmitted.
You cannot reschedule with the current active plan. Do you want to create new plan to schedule production request(s) and to reactivate the plan?	Cannot replan under the same plan name. 1. Select **Yes** to create a new plan that can be used for replanning. 2. Select **No** and use an existing plan to activate and replan.
You have already submitted the plan, <plan name> and this plan is currently active. Do you want to create a new plan?	If the operator has already submitted this plan for activation, PWB will not allow it to be submitted twice. 1. Select **Yes** to create a new plan that can be used for replanning. 2. Select **No** and use an existing plan to activate and replan.
You need to save the current plan before you activate the plan!!!	Insures consistency between the database active plan and what actually gets activated. Select **Yes** to save the plan. The next time activation is attempted there will be no error message.

Table 5. Hosts, Servers, Clients and Other Software Relevant to Production Planning

HOST	SERVER/CLIENT/OTHER SOFTWARE
Planning/Management Workstation	Production Request Editor (EcPlPREditor) Planning Workbench GUI (EcPlWb) Production Strategies GUI (EcPlProdStrat) Production Planning Timeline (EcPlTl) Subscription Editor (EcPlSubsEdit) Message Handler (EcPlMsh) System Name Server (EcPlSns) Resource Model (EcPlRm)
Queuing Server (e.g., x0sps04)	**Subscription Manager (EcDpPlSubMgr)** **Job Management Server (EcDpPrJobMgmt)**
SDSRV Server (e.g., x0acs03)	**Science Data Server (EcDsScienceDataServer)**
Interface Server 01 (e.g., x0ins02)	**Advertising Server (EcIoAdServer)**
Interface Server 02 (e.g., x0ins01)	**Subscription Server (EcSbSubServer)**

NOTE: Servers that are displayed on ECS Assistant are shown in **boldface** type in the table.

NOTE: Depending on the installation, software may be loaded on hosts other than the examples provided.

Handling a Failure to Generate DPRs

There are several possible reasons for the Planning Subsystem to fail to generate DPRs. A failure to generate DPRs could come from any of the following errors:

- Not all the required servers are up and running properly. For example,…
  - During DPR generation, the DPR generation executable turns the subscriptionFlag from zero to non-zero, which requires that the Subscription Server be up and running.
  - The executable queries Science Data Server for input granules.
- Database queries fail.
- ESDTs required for the PGE were not properly installed.
- Information in PGE ODL and/or ESDT ODL files is incorrect.

The last two types of problem should have been detected and corrected in SSI&T.

After ensuring (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are "up," the following items should be checked:

- Production Request Editor ALOG file.
- ALOG files in other subsystems.

- PDPS database.
  - PlDataTypeMaster table.
  - PlDataGranuleShort table.

Checking the Production Request Editor ALOG File

The procedure for checking the Production Request Editor ALOG file starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03).

Checking the Production Request Editor ALOG File

---

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the planning log files (e.g., EcPlPREditor.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., EcPlPREditor.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the log contains an error message that indicates why the DPR generation failed.

5 If the log contains an error message which indicates that a configuration item in another subsystem may be the source of the problems, go to the procedure for **Checking the ALOG Files in Other Subsystems** (subsequent section of this lesson).

6 If the log contains an error message that indicates why the DPR generation failed and the problem is within the Planning Subsystem, respond to the problem as follows:

- DCE problems.
  - Notify the Operations Controller/System Administrator of suspected DCE problems.
- Database problems.
  - Verify that relevant database servers are running.

- Check for lack of (or corruption of) data in the database using either a database browser or isql commands.
- Notify the Database Administrator of suspected database problems.

- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

7 If the log does **not** contain an error message that indicates why the DPR generation failed, perform the procedure for **Checking the PDPS Database for Causes of Failure to Generate DPRs** (subsequent section of this lesson).

Checking the ALOG Files in Other Subsystems

The procedure for checking the ALOG files in other subsystems starts with the assumption that the operator has logged in to the ECS system.

Checking the ALOG Files in Other Subsystems

---

1 Log in to the appropriate host as described in Steps 1 through 6 of the procedure for **Launching the Production Request Editor** (previous section of this lesson).

- Appropriate hosts include the following machines:
  - Science Data Server host (e.g., e0acs05, g0acs03, l0acs03, n0acs04).
  - Advertising Server host (e.g., e0ins02, g0ins02, l0ins02, n0ins02).
  - Subscription Server host (e.g., e0ins01, g0ins01, l0ins01, n0ins01).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the appropriate log files (e.g., EcDsScienceDataServer.ALOG, EcIoAdServer.ALOG, EcSbSubServer.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., EcDsScienceDataServer.ALOG, EcIoAdServer.ALOG, EcSbSubServer.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the log contains an error message that indicates why the DPR generation failed.

5 If the log contains an error message that indicates why the DPR generation failed, respond to the problem as follows:

- DCE problems.
  - Notify the Operations Controller/System Administrator of suspected DCE problems.
- Database problems.
  - Verify that relevant database servers are running.
  - Check for lack of (or corruption of) data in the database using either a database browser or isql commands.
  - Notify the Database Administrator of suspected database problems.
- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

6 If the log does **not** contain an error message that indicates why the DPR generation failed, perform the procedure for **Checking the PDPS Database for Causes of Failure to Generate DPRs** (subsequent section of this lesson).

Checking the PDPS Database for Causes of Failure to Generate DPRs

The PDPS database is a useful resource for troubleshooting a failure to generate DPRs. Certain values must be entered in tables in the PDPS database during the DPR generation process in order for the DPRs to be successfully generated.

- The subscriptionFlag values (PlDataTypeMaster table) for all the data types (ESDTs) needed for the PGE are set.
- The Science Data Server UR is entered in the dataServUrString column (PlDataTypeMaster table) for all data types (ESDTs) needed for the PGE.
- If the PGE specified in the Production Request requires static files, the URs for the static files are included in PlDataGranuleShort table (universalReference column).

The procedure to check the PDPS database for causes of failure to generate DPRs starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03).

Checking the PDPS Database for Causes of Failure to Generate DPRs

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Enter isql commands for checking the PDPS database PlDataTypeMaster table subscriptionFlag column values for all data types (dataTypeId column) needed for the PGE.

- For example:

```
1> select dataTypeId,subscriptionFlag from PlDataTypeMaster
2> go
 dataTypeId           subscriptionFlag
 -------------------- ----------------
 AM1ATTNF#001                       40
 AM1EPHN0#001                       39
 AP#001                              1
 ActSched#001                       38
 DAP#001                             1
 MI1B1#001                           0
 MI1B2E#001                          0
 MI1B2T#001                          0
 MIANCAGP#001                        0
 MIANCARP#001                        0
 MIANCSSC#001                        0
 MIANPP#001                          0
 MIANRCCH#001                        0
 MIB1LM#001                          0
 MIB2GEOP#001                       42
 MICNFG#001                          0
 MIL1A#001                           0
 PGEEXE#001                          1
 PH#001                              1
 SSAPC#001                           1

(20 rows affected)
```

- For detailed instructions refer to the procedure for **Using ISQL to Check Database Tables** (subsequent section of this lesson).
- During DPR generation, the DPR executable should turn the subscriptionFlag for all the data types (ESDTs) needed for the PGE from zero to non-zero.
- If the subscriptionFlag values for the data types did not turn to non-zero, subscription trouble is indicated.

3 If the subscriptionFlag value for any ESDT needed for the PGE is **zero**, make a note of the fact for subsequent reporting of the problem.

4 Enter isql commands for checking the PDPS database PlDataTypeMaster table dataServUrString column values for all data types (dataTypeId column) needed for the PGE.

- For example:

```
1> select dataTypeId,dataServUrString from PlDataTypeMaster
2> go
 dataTypeId
         dataServUrString
 --------------------
        ---------------------------------------------------------
 AM1ATTNF#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 AM1EPHN0#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 AP#001
         NULL
 ActSched#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 DAP#001
         NULL
 MI1B1#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MI1B2E#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MI1B2T#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIANCAGP#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIANCARP#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIANCSSC#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIANPP#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIANRCCH#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIB1LM#001
         NULL
 MIB2GEOP#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MICNFG#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 MIL1A#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 PGEEXE#001
         UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]
 PH#001
         NULL
 SSAPC#001
         NULL

(20 rows affected)
```

- During DPR generation, the DPR executable should turn the dataServUrString for all the ESDTs needed for the PGE from "NULL" to the UR value for Science Data Server (e.g., UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]).

5 If the dataServUrString value for any ESDTs needed for the PGE does not have the UR value for the Science Data server (e.g., is NULL), make a note of the fact for subsequent reporting of the problem.

6 If the PGE specified in the Production Request requires static files, enter isql commands for checking the PDPS database PlDataGranuleShort table universalReference column for the URs of the necessary static files.

- The dataTypeId can be used for filtering results when querying the PlDataGranuleShort table.
- For example:

```
1> select dataTypeId,universalReference from PlDataGranuleShort where
dataTypeId = "AM1ATTNF#001"
2> go
 dataTypeId
         universalReference
 --------------------
        ------------------------------------------------------------
--------------------------------------------------------------------

 AM1ATTNF#001
         UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]:20:
SC:AM1ATTNF.001:1449

(1 row affected)
```

- If the PGE requires static files, the URs for the static files must be included in the PlDataGranuleShort table in order for a DPR to be successfully generated.
- For dynamic granules, the corresponding UR values may become available during DPR generation; however, if the dynamic granules' URs do not become available during DPR generation, there is no effect on DPR generation.

7 If the PGE requires static files, and the URs for the static files are **not** in the PlDataGranuleShort table, make a note of the fact for subsequent reporting of the problem.

8 If any problems were noted in the PDPS database (e.g., subscriptionFlag value zero or no static file UR), report the problem(s) to the SSI&T team and/or call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

- There may be a problem with PGE registration (especially if no other PGEs are affected) or other problem associated with the SSI&T process.

Using ISQL to Check Database Tables

The PDPS database is the repository of data concerning PGEs, Production Requests, Data Processing Requests, Production Strategies, Production Plans and other production-related data. The data stored in the database can be checked using either a database browser or isql commands. The procedure in this section describes how to check the tables using isql commands.

The procedure for using isql to check database tables starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03).

Using ISQL to Check Database Tables

---

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Type **isql –U*userID* -P*password* -S*DBServer*** then press **Return/Enter**.

- For example:

  isql –Updps_role –Pgreetings –St1pls01_srvr

3 Type **use** ***dbname*** at the 1> prompt then press **Return/Enter**.

- The ***dbname*** is likely to be one of the following names:
  - **pdps** [OPS mode].
  - **pdps_TS1** [TS1 mode].
  - **pdps_TS2** [TS2 mode].

4 Type **go** at the 2> prompt then press **Return/Enter**.

5 Type **select * from *TableName*** at the 1> prompt then press **Return/Enter**.

- Alternatively, type **select *columnName* from *TableName*** at the 1> prompt then press **Return/Enter**.
- Another alternative is to type **select *columnName1,columnName2[,columnName3,…]* from *TableName*** at the 1> prompt then press **Return/Enter**.

6 Type **go** at the 2> prompt then press **Return/Enter**.

- Table contents are displayed.
  - If ***** was specified, all entries in the table are displayed.
  - If specific columnNames were entered, the data associated with those columns only are displayed.

7 To exit from isql type **quit** at the 1> prompt then press **Return/Enter**.

Handling a DPR Scheduling failure

Problems scheduling a PGE for execution in the system occur when a DPR, scheduled through the Planning Workbench, does not get passed to AutoSys via Job Management. After ensuring (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 5) are "up," the following items should be checked:

- Planning Workbench ALOG file.
- PDPS database.
  - PlDataProcessingRequest table.
  - PlDataGranuleShort table.

Checking the Planning Workbench ALOG File

The procedure for checking the Planning Workbench ALOG file starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03).

Checking the Planning Workbench ALOG File

---

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the planning log files (e.g., EcPlWb.ALOG).

3 Type **pg *filename*** then press Return/Enter.

- ***filename*** refers to the data processing log file to be reviewed (e.g., EcPlWb.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the log contains an error message that indicates why the DPR scheduling failed.

- For example: "DCE Error in sending job to JobMgmt."

6 If the log contains an error message that indicates why DPR scheduling failed, respond to the problem as follows:

- DCE problems.
  - Notify the Operations Controller/System Administrator of suspected DCE problems.

- Database problems.
  - Verify that relevant database servers are running.
  - Check for lack of (or corruption of) data in the database using either a database browser or isql commands.
  - Notify the Database Administrator of suspected database problems.
- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

7 If the log does **not** contain an error message that indicates why DPR scheduling failed, perform the procedure for **Checking the PDPS Database for Causes of DPR Scheduling Failure** (subsequent section of this lesson).

Checking the PDPS Database for Causes of DPR Scheduling Failure

The PDPS database is a useful resource for troubleshooting a failure to schedule DPRs. During scheduling, the PDPS database is updated to reflect a change in the state of the DPR.

- The PlDataProcessingRequest table shows a value of "NULL" in the completionState field if the DPR did **not** get passed to Data Processing.
- Input data granules that are ready for use by a PGE running in the system have entries with full URs in the PDPS database PlDataGranuleShort table universalReference column for the data types (ESDTs) needed for the PGE.
  - A standalone PGE (not running as part of a PGE chain) needs the full UR.
    - If the PGE is running as part of a PGE chain, the input granules are products of preceding PGEs in the chain.
  - If, in the ESDT ODL files prepared for the input granules, the dynamic flag is set to "external" instead of "internal," the DPR should go to Data Processing as soon as the input granules become available.
  - If the dynamic flag is set as "internal," the DPR should go to Data Processing regardless of the availability of the input granules.
    - Job (DPR) execution should start and the color of AutoXpert JobScape display should change as soon as the input granules become available.

The procedure for checking the PDPS database for causes of DPR scheduling failure starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03).

Checking the PDPS Database for Causes of DPR Scheduling Failure

---

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Enter isql commands for checking the value listed in the completionState field for the relevant DPR in the PlDataProcessingRequest table in the PDPS database.

- The dprId can be used for filtering results when querying the PlDataProcessingRequest table.
- For example:

```
1> select dprId,completionState from PlDataProcessingRequest where
dprId = "MPGE1AA#2.011640140PS"
2> go
 dprId                         completionState
 ----------------------------- ---------------
 MPGE1AA#2.011640140PS         NULL

(1 row affected)
```

- For detailed instructions refer to the procedure for **Using ISQL to Check Database Tables** (subsequent section of this lesson).
- The PlDataProcessingRequest table has a value of “NULL” in the completionState field if the DPR did **not** get passed to Data Processing.

3 If the PlDataProcessingRequest table has a value of “NULL” in the completionState field for the DPR, make a note of the fact for subsequent reporting of the problem.

4 Enter isql commands to identify all input data granules (granuleId) needed for the PGE.

- Search the PlDprData table for entries related to the particular dprId.
- For example:

```
1> select dprId,granuleId from PlDprData where dprId =
"MPGE1AA#2.011640140PS"
2> go
 dprId
         granuleId
 -----------------------------
        -------------------------------------------------------------
---------------------------------------------------------------------
 MPGE1AA#2.011640140PS
         AM1ATTNF#00107011998164014000
 MPGE1AA#2.011640140PS
         AM1EPHN0#00107011998164014000
 MPGE1AA#2.011640140PS
         ActSched#00107011998164014000
 MPGE1AA#2.011640140PS
         MI1B1#00107011998164014000
 MPGE1AA#2.011640140PS
         MI1B2E#00107011998164014AssociatedSensorShortNameAA000
 MPGE1AA#2.011640140PS
         MI1B2T#00107011998164014AssociatedSensorShortNameAA000
 MPGE1AA#2.011640140PS
         MIANCAGP#001L1000
```

```
MPGE1AA#2.01164014OPS
        MIANCARP#001C0001000
MPGE1AA#2.01164014OPS
        MIANCARP#001C1001000
MPGE1AA#2.01164014OPS
        MIANCARP#001C2001000
MPGE1AA#2.01164014OPS
        MIANCARP#001C3001000
MPGE1AA#2.01164014OPS
        MIANCSSC#001L1000
MPGE1AA#2.01164014OPS
        MIANPP#001L1301000
MPGE1AA#2.01164014OPS
        MIANRCCH#00107011998164014000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998164014000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998165642000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998171310000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998172938000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998174606000
MPGE1AA#2.01164014OPS
        MIB1LM#00107011998180234000
MPGE1AA#2.01164014OPS
        MIB2GEOP#00107011998164014000
MPGE1AA#2.01164014OPS
        MICNFG#001C11000
MPGE1AA#2.01164014OPS
        MICNFG#001C12000
MPGE1AA#2.01164014OPS
        MICNFG#001C13000
MPGE1AA#2.01164014OPS
        MICNFG#001C14000
MPGE1AA#2.01164014OPS
        MICNFG#001L11000
MPGE1AA#2.01164014OPS
        MIL1A#00107011998164014000
MPGE1AA#2.01164014OPS
        MIRCCM#00107011998164014AssociatedSensorShortNameAA000
MPGE1AA#2.01164014OPS
        MIRCCT#001O12000
MPGE1AA#2.01164014OPS
        MIRCCT#001O17000
MPGE1AA#2.01164014OPS
        MIRFOI#001L1301000
MPGE1AA#2.01164014OPS
        MISANCGM#001L1000
MPGE1AA#2.01164014OPS
        MISBR#00107011998164014000
MPGE1AA#2.01164014OPS
        MISBR#00107011998164014010
MPGE1AA#2.01164014OPS
        MISL0AA#00107011998164014000
MPGE1AA#2.01164014OPS
```

```
        MISQA#00107011998164014000
MPGE1AA#2.01164014OPS
        MISQA#00107011998164014025
MPGE1AA#2.01164014OPS
        MISQA#00107011998164014026
MPGE1AA#2.01164014OPS
        MISQA#00107011998164014027
MPGE1AA#2.01164014OPS
        MISQA#00107011998164014028

(40 rows affected)
```

5 Enter isql commands for checking the PDPS database PlDataGranuleShort table universalReference field entries for the URs of all input data granules (granuleId) needed for the PGE.

- For example:

```
1> select granuleId,universalReference from PlDataGranuleShort where
granuleId = "AM1ATTNF#00107011998164014000"
2> go

         granuleId
         universalReference

        -------------------------------------------------------------
         ------------------------------------------------------------

         AM1ATTNF#00107011998164014000
         UR:10:DsShESDTUR:UR:15:DsShSciServerUR:13:[MDC:DSSDSRV]:20:S
C:AM1ATTNF.001:1449

(1 row affected)
```

- Input data granules that are ready for use by a PGE running in the system have entries with full URs in the PDPS database PlDataGranuleShort table universalReference column for the data types (ESDTs) needed for the PGE.
- A standalone PGE (not running as part of a PGE chain) needs the full UR.
  - If the PGE is running as part of a PGE chain, the input granules are products of preceding PGEs in the chain.
- If, in the ESDT ODL files prepared for the input granules, the dynamic flag is set to “external” instead of “internal,” the DPR should go to Data Processing as soon as the input granules become available.
- If the dynamic flag is set to “internal,” the DPR should go to Data Processing regardless of the availability of the input granules.
  - PGE execution should start and the color of AutoXpert JobScape display should change as soon as the input granules are available.

6 If the universalReference field for any ESDT needed for the PGE does **not** have the necessary UR, make a note of the fact for subsequent reporting of the problem.

7 If any problems were noted in the PDPS database (e.g., completionState of NULL for a DPR or no UR for an ESDT), report the problem(s) to the SSI&T team and/or call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Checking Log Files

Log files can provide indications of the following types of problems:

- DCE problems.
- Database problems.
- Lack of disk space.

The procedure for checking log files starts with the assumption that the operator has logged in to the ECS system and the Planning Subsystem host.

Checking Log Files

1 Access a terminal window logged in to the appropriate host.

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the production planning log files (e.g., EcPlPREditor.ALOG, EcPlWb.ALOG, EcPlTl.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the production planning log file to be reviewed (e.g., EcPlPREditor.ALOG, EcPlPREditor_IF.ALOG, EcPlProdStrat.ALOG, EcPlWb.ALOG, EcPlTl.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **tail**, **more**, **vi**) can be used to review the log file.

4 Review the log file to identify problems that have occurred.

5 Respond to problems as follows:

- DCE problems.
  - Notify the Operations Controller/System Administrator of suspected DCE problems.

- Database problems.
  - Verify that relevant database servers are running.
  - Check for lack of (or corruption of) data in the database using either a database browser or isql commands.
  - Notify the Database Administrator of suspected database problems.
- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

Checking Database Connections

If applications (including the GUIs) are unable to connect to the database, data cannot be retrieved or (in the case of the GUIs) displayed. Consequently, if a GUI does not display data or if the display does not refresh, checking the database connections is a logical step in trying to isolate the problem.

The procedure for checking database connections starts with the assumption that the operator has logged in to the ECS system and the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

Checking Database Connections

---

1 Access a terminal window logged in to the Planning/Management Workstation (e.g., e0pls03, g0pls01, l0pls02, or n0pls02).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/cfg** then press **Return/Enter**.

3 Type **view *filename*** then press **Return/Enter**.

- The ***filename*** is likely to be one of the following files:
  - EcPlPREditor.CFG
  - EcPlProdStrat.CFG
  - EcPlRm.CFG
  - EcPlSubsEdit.CFG
  - EcPlTl.CFG
  - EcPlWb.CFG

- Although this procedure has been written for the **view** command, any UNIX editor or visualizing command (e.g., **vi**, **pg**, **more**) can be used to review the log file.

4 Review the configuration file to identify the values for the following parameters:

- **DBName.**
- **DBServer.**
- **DBMaxConnections.**

5 Type **:q!** then press **Return/Enter** to quit the view application.

6 Type **isql –U*userID* -P*password* -S*DBServer*** then press **Return/Enter**.

- For example:

  isql –Updps_role –Pgreetings –St1pls01_srvr

7 Type **sp_who** at the 1> prompt then press **Return/Enter**.

8 Type **go** at the 2> prompt then press **Return/Enter**.

- A listing similar to the following one is displayed (some lines have been deleted):

```
 spid   status       loginame                        hostname   blk
        dbname                        cmd
------ ------------ ----------------------------- ---------- -----
       ----------------------------- ----------------
     1 recv sleep   EcDpPrDeletion                              0
        pdps_TS1                      AWAITING COMMAND
     2 sleeping     NULL                                        0
        master                        NETWORK HANDLER
     3 sleeping     NULL                                        0
        master                        DEADLOCK TUNE
     4 sleeping     NULL                                        0
        master                        MIRROR HANDLER
     5 sleeping     NULL                                        0
        master                        HOUSEKEEPER
     6 sleeping     NULL                                        0
        master                        CHECKPOINT SLEEP
     7 sleeping     NULL                                        0
        master                        AUDIT PROCESS
     8 recv sleep   EcPlSubMgr                                  0
        pdps                          AWAITING COMMAND
     9 recv sleep   EcPlSubMgr                                  0
        pdps                          AWAITING COMMAND
    10 recv sleep   EcDpPrDeletion                              0
        pdps                          AWAITING COMMAND
    11 recv sleep   EcDpPrJobMgmt                               0
        pdps                          AWAITING COMMAND
    12 recv sleep   pdpsUsers                       x0ais03     0
        master                        AWAITING COMMAND
    13 recv sleep   EcDpPrJobMgmt                               0
        pdps                          AWAITING COMMAND
    14 recv sleep   EcDpPrDeletion                              0
        pdps                          AWAITING COMMAND
```

```
15 recv sleep   pdpsUsers                             x0pls02    0
    master                         AWAITING COMMAND
16 recv sleep   EcDpPrJobMgmt                                    0
    pdps_TS1                       AWAITING COMMAND
17 recv sleep   EcDpPrJobMgmt                                    0
    pdps_TS1                       AWAITING COMMAND
18 recv sleep   pdpsUsers                             x0ais03    0
    tempdb                         AWAITING COMMAND
19 recv sleep   EcDpPrDeletion                                   0
    pdps_TS1                       AWAITING COMMAND
20 recv sleep   pdpsUsers                             x0pls02    0
    tempdb                         AWAITING COMMAND
21 recv sleep   pdpsUsers                             x0pls01    0
    pdps_TS1                       AWAITING COMMAND
22 recv sleep   EcPlRm                                           0
    pdps_TS1                       AWAITING COMMAND
23 recv sleep   EcPlWb                                           0
    pdps_TS1                       AWAITING COMMAND
24 recv sleep   EcPlSubMgr                                       0
    pdps_TS1                       AWAITING COMMAND
25 recv sleep   EcPlSubMgr                                       0
    pdps_TS1                       AWAITING COMMAND
26 recv sleep   EcPlSubMgr                                       0
    pdps_TS1                       AWAITING COMMAND
27 recv sleep   EcPlSubMgr                                       0
    pdps_TS1                       AWAITING COMMAND
28 running      pdps_role                             x0pls01    0
    pdps                           SELECT

(28 rows affected)
(return status = 0)
```

9 Type **sp_configure "user connections"** at the 1> prompt then press **Return/Enter**.

10 Type **go** at the 2> prompt then press **Return/Enter**.

- A listing similar to the following one is displayed:

```
 Parameter Name                 Default     Memory Used Config Value
        Run Value
 ------------------------------ ----------- ----------- ------------
        -----------
 number of user connections              25        7503          100
                100

(1 row affected)
(return status = 0)
```

11 Type **quit** at the 1> prompt then press **Return/Enter**.

12 Compare the number of actual connections (results of **sp_who**) with the number of connections for which the database has been configured (results of **sp_configure "user connections"**).

13 If the number of actual connections is very close to the number of connections for which the database has been configured, notify the Database Administrator of the fact.

14 If the number of actual connections is **not** very close to the number of connections for which the database has been configured, compare the number of actual connections with value for DBMaxConnections identified in the Data Distribution configuration file (Step 4).

15 If the number of actual connections is very close to the value for DBMaxConnections, notify the Database Administrator of the fact.

- It may be advisable to increase the value assigned to DBMaxConnections in the configuration file.

Launching the AutoSys GUI Control Panel

Launching the AutoSys GUI Control Panel

The following software applications are associated with Production Processing (excluding Science Software Integration and Test (SSI&T) and Science Data Processing Toolkit applications):

- Subscription Manager.
- Job Management.
- Data Management.
- Execution Management.
- PGE Management.
- Deletion Server.
- AutoSys/AutoXpert.
- QA Monitor.

Access to the Production Processing tools must be gained through the use of UNIX commands.

Launching the AutoSys GUI Control Panel starts with the assumption that the applicable servers are running and the Production Monitor has logged in to the ECS system.

Launching the AutoSys GUI Control Panel

NOTE: Commands in Steps 1 through 11 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY** ***clientname*****:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Queuing Server host by typing **/tools/bin/ssh *hostname*** (e.g., **e0sps04**, **g0sps06**, **l0sps03**, or **n0sps08**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>’s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g,, cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

8 Type **cd /*path*** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/COTS/autotreeb/autouser, /usr/ecs/*MODE*/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., FMR.autosys.csh.g0sps06).
- The particular path to be typed may vary from site to site.

9 Type **source *AUTOSYSINSTANCE*.autosys.csh.*hostname*** then press **Return/Enter**.

- An ***AUTOSYSINSTANCE*** (also called an AUTOSERV instance) is installed as part of the Data Processing Subsystem and is identified by three capital letters.
  - For example, an AutoSys instance at the GSFC DAAC might be identified as **FMR**.
- It is possible to have multiple AutoSys instances installed at a DAAC.

10 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the AutoSys start script (e.g., EcDpPrAutosysStart).
- The ***MODE*** will most likely be one of the following operating modes:
  - — OPS (for normal operation).
  - — TS1 (for SSI&T).
  - — TS2 (new version checkout).
- Note that the separate subdirectories under /usr/ecs apply to (describe) different operating modes.

11 Type **EcDpPrAutosysStart *MODE AUTOSYSINSTANCE*** then press **Return/Enter**.

- The **AutoSys GUI Control Panel** (Figure 39) is displayed.

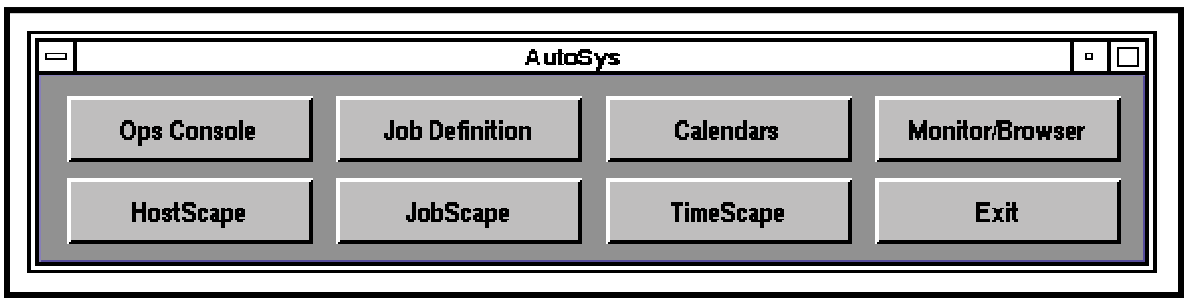

Figure 39. AutoSys GUI Control Panel

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Configuring AutoSys Screens/Displays

AutoSys/AutoXpert Production Scheduling Tool

The Planning and Data Processing Subsystems provide a batch processing environment to support the generation of data products. They manage, queue and execute Data Processing Requests (DPR) on the processing resources at a DAAC. The DPRs are submitted from the Planning Subsystem. The Planning and Data Processing Subsystems provide the operational interfaces needed to monitor the execution of science software PGEs specified in the DPRs.

The AutoSys/AutoXpert software is a production scheduling tool intended to support the operational activities surrounding production processing. It assists with the following activities (among others):

- job monitoring.
- job scheduling.
- fault notification.
- job restart.
- determining the effects of failure of a DPR.
- determining the cause and actions to be taken due to the failure of a DPR.

AutoSys recognizes the following three categories of jobs:

- Box jobs.
- Command jobs.
- File-watcher jobs.

A box job is a collection of other jobs. It performs no processing action other than providing an organizational structure for a group of jobs that should be run within the same time period. Box jobs can be nested; i.e., box jobs can be included in other box jobs. Box jobs are particularly useful for organizing, managing, and administering large numbers of jobs, which are interrelated or have complex logic flows.

Box jobs are subject to the following rules:

- If no other starting conditions are specified at the job level, a job within a box job runs as soon as the starting conditions for the box are satisfied.

- If there are no job-level starting conditions for some of the jobs in a box, those jobs will run in parallel.
  - The jobs will run only once even if multiple start times are specified for some of the individual jobs.
  - Consequently, jobs in boxes will not be run several times inadvertently.
- Whenever any job in a box changes state, all jobs in the box are checked to see if they are eligible to be run.

A command job is the type most commonly thought of as a “job.” The “command” can be a shell script, the name of an executable program, a file transfer, or any other command that causes execution of a UNIX command on a client machine. When all of the starting conditions for the particular job have been met, AutoSys performs the following functions:

- executes the command (runs the job).
- captures the exit code at job completion.
- sends the exit event (success or failure) and code back to the relational database management system (RDBMS).

A file-watcher job functions in a manner that is similar to a command job; however, it has a special purpose, i.e., to monitor the creation and size of a particular operating system file. When the file has reached a specified minimum size and is no longer increasing in size, the file-watcher job sends AutoSys an event indicating that the file has arrived. The file-watcher job allows AutoSys to know the status of external files that are needed in the processing of command jobs or box jobs.

When determining whether to start a job of any type, AutoSys evaluates the job with respect to the following the following starting parameters:

- Date and time scheduling parameters are met.
- Starting Conditions specified in the job definition evaluate to “true.”
- For jobs in a box, the box must be in the RUNNING state.
- The current status of the job is not ON_HOLD or ON_ICE.

Every time there is an event that changes the truth of any of the preceding parameters, AutoSys finds all jobs that may be affected by the change and determines whether or not to start them.

In ECS each DPR generated by the Planning Subsystem defines a box job for AutoSys. Every DPR/box job is composed of seven command jobs that run in the following order:

- Allocation (EcDpPrEM)
- Staging (EcDpPrDM)
- Pre-processing (EcDpPrEM)

- Execution (EcDpPrRunPGE)
- Post-processing (EcDpPrEM)
- Insertion (EcDpPrDM)
- Deallocation (EcDpPrEM)

Each ECS job name indicates the mode in which the DPR was generated and the stage of processing. The following list of job names for a DPREP DPR provides an illustration:

- AM1Eph#2.012302200TS2
- AM1Eph#2.012302200TS2A
- AM1Eph#2.012302200TS2S
- AM1Eph#2.012302200TS2P
- AM1Eph#2.012302200TS2E
- AM1Eph#2.012302200TS2p
- AM1Eph#2.012302200TS2I
- AM1Eph#2.012302200TS2D

The first job name in the list is a DPR/box job-level name. The last three characters of the DPR/box job-level name (i.e., TS2) indicate the mode in which the DPR was generated. The last four characters of the remaining (command) job names in the list indicate the mode (i.e., TS2) and the stage of processing. The job name that ends in “A” is the allocation job; the job name that ends in “S” is the staging job; etc.

Each of the last six ECS command jobs (i.e., staging through deallocation) is dependent on successful completion of the command job that precedes it. For example, staging does not start until allocation has been successfully completed.

Just as the command jobs within a box job are dependent on the successful completion of other jobs, a DPR/box job itself may be dependent on the successful completion of some other box job(s). Such dependencies usually involve a need for the output of another DPR as input.

The following rules apply to DPR dependencies:

- Any DPRs which depend on data that are not yet available are kept in a "held" state by AutoSys until their data availability subscriptions are fulfilled.
- The subscription manager software, which is part of the Planning Subsystem, receives subscription notifications for the DPRs and informs the DPS to release the AutoSys jobs after all data subscriptions for a given DPR are fulfilled.
- The Data Processing Subsystem (as managed by the AutoSys Job Scheduling engine) runs the PGEs and associated jobs as the resources required for the tasks become available.

- The procedure continues until all DPRs scheduled for that day have completed.

There is an optimum number of jobs for an AutoSys instance. The optimum number of jobs is allocated among the active modes (e.g., OPS, TS1, and TS2) according to their level of activity. During start-up the Job Management server in the Data Processing Subsystem determines the number of jobs in the PDPS database associated with Job Management's operating mode and compares the number with the maximum allowable for the mode. The maximum is specified in the Job Management configuration file (i.e., the value assigned to the variable DpPrAutoSysMaxJobs in the EcDpPrJobMgmt.CFG file). Job Management deletes from AutoSys the successfully completed jobs associated with the applicable mode only. Deleting completed jobs makes room for other jobs in the processing queue.

The DAAC Production Monitor uses AutoSys/AutoXpert when performing the following functions:

- modifying DPR priorities and inputs as required.
- transferring/deleting/suspending/resuming DPRs as required (e.g., requests, resource problems, input data schedule problems, special events, schedules replans, etc.).
- monitoring and providing processing status upon request.

The Production Monitor can configure some aspects of AutoSys/AutoXpert, including the runtime options.

Configuring AutoSys/AutoXpert Runtime Options

This section explains how to configure AutoSys/AutoXpert runtime options. The Production Monitor can define the following runtime options:

- Refresh Interval.
  - Determines how often the View Region (the area on the right side of the GUI display where data are presented) will be updated.
- Ping Interval.
  - Defines how often the connectivity will be evaluated.
- Hang Time.
  - Specifies the length of time jobs will continue to be displayed within a machine after they have completed running.
- Inches/Hr.
  - Indicates how much information is displayed on the screen.

There are default values that apply to the runtime options until the Production Monitor modifies them.

Table 6 lists the runtime options available for HostScape, TimeScape, and JobScape. Not all options are available for all GUI's.

Table 6. Runtime Options Table

Interface	Refresh Interval	Hangtime	PING	Inches/Hour
HostScape	X	X	X	
TimeScape	X			X
JobScape	X			

The procedure for configuring AutoSys/AutoXpert runtime options assumes that AutoSys has been launched and the **AutoSys GUI Control Panel** (Figure 39) is being displayed. Perform only the steps that are applicable to the changes to be made (as specified in Table 6). Note that if the Freeze Frame feature is enabled, any changes entered will not take place until Freeze Frame has been disabled.

Configuring AutoSys/AutoXpert Runtime Options

---

1 Click on either the **HostScape**, **TimeScape**, or **JobScape** button as applicable.

- The AutoXpert GUI corresponding to the selected button is displayed (Figures 40-42).

2 Select **Options** → **Edit Runtime Options** from the pull-down menu.

- The **Runtime Options** dialog box is displayed.

3 If the refresh interval is to be modified, click on **Refresh Interval (Seconds)** and either type in a value between **1** and **99999** or click on the **<|** and **|>** keys as necessary to decrease or increase the current numerical value until the desired value is reached.

- Default value is **30 seconds**.
- The **Reloading Job Data** window reappears as often as specified in the **Refresh Interval (Seconds)** field.

4 If the ping interval is to be modified, click on **Ping Interval (Seconds)** and either type in a value between **1** and **99999** or click on the **<|** and **|>** keys as necessary to decrease or increase the current numerical value until the desired value is reached.

- Default value is **300 seconds**.
- If **99999** is entered, no **ping** commands are issued.

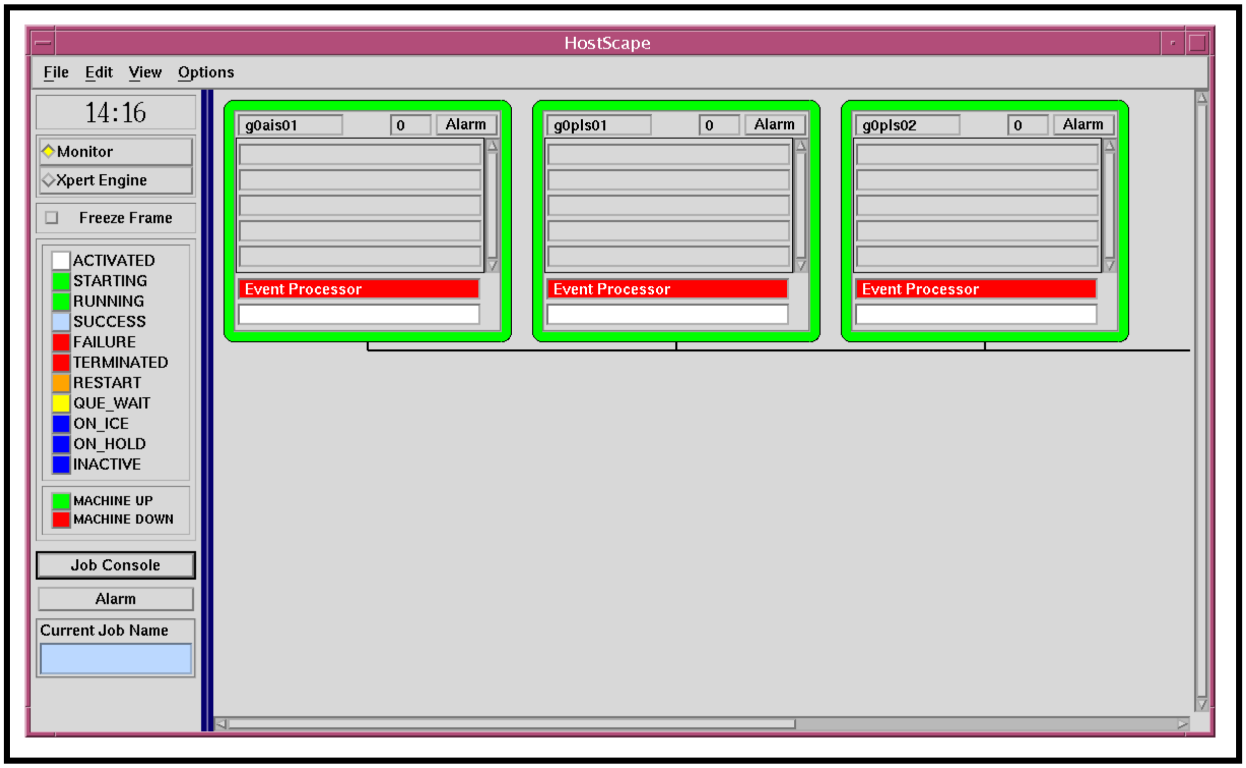

Figure 40. AutoXpert HostScape GUI

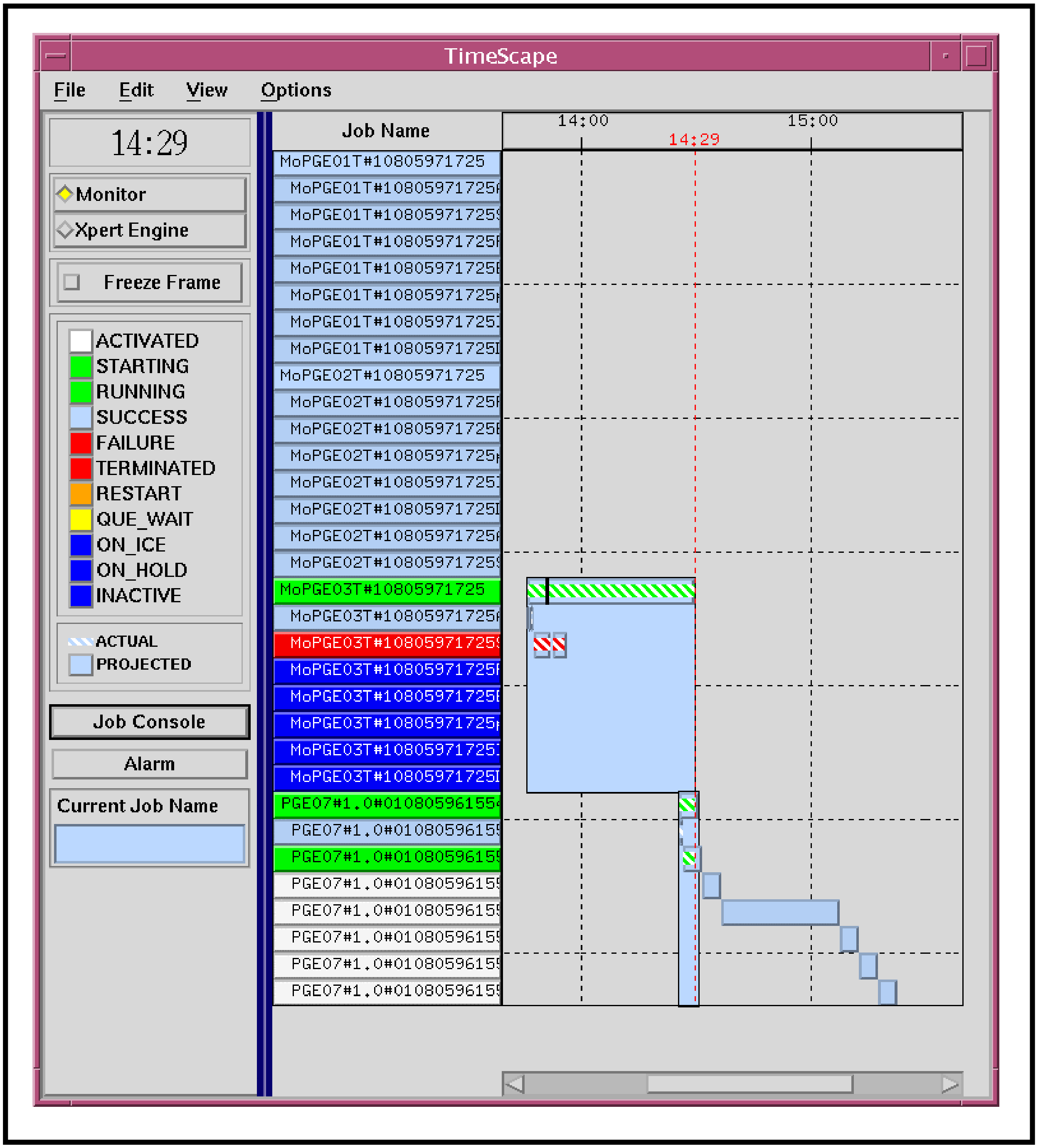

Figure 41. AutoXpert TimeScape GUI

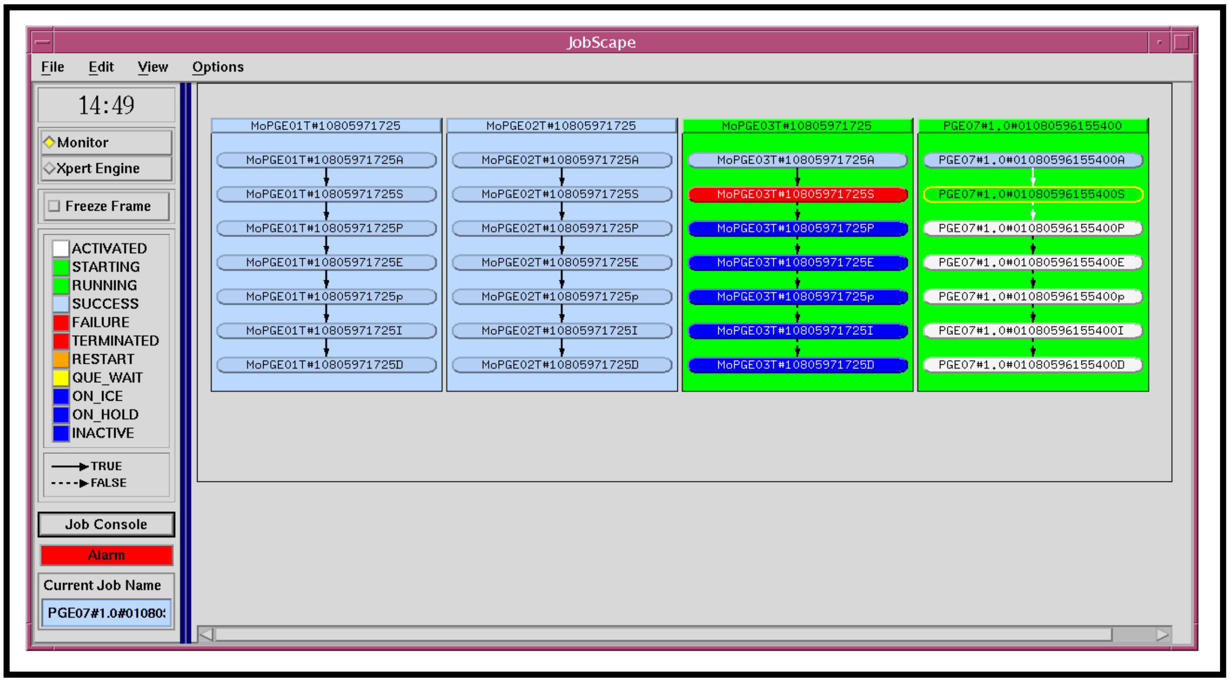

Figure 42. AutoXpert JobScape GU

5 If the hang time is to be modified, click on **Hang Time (Minutes)** and either type in a value between **1** and **99999** or click the <| and |> keys as necessary to decrease or increase the current numerical value until the desired value is reached.

- Default value is **1 minute**.

6 If the number of inches/hour is to be modified, click on **Inches/Hr (inches)** and either type in a value or click the <| and |> keys as necessary to decrease or increase the current numerical value until the desired value is reached.

- Default value is **2 inches/hr**.

7 When all desired modifications have been entered, click on the **OK** button.

- The runtime options are set.
- The dialog box closes.

8 If another of the AutoXpert GUIs needs to have its runtime options configured, repeat Steps 2 through 7 for the next GUI.

9 To quit any of the AutoXpert GUIs (HostScape, JobScape or TimeScape) select **File** → **Exit** then click on the **OK** button.

10 To quit AutoSys click on the **Exit** button of the **AutoSys GUI Control Panel**.

Configuring Hardware Groups

This section explains how to configure AutoSys hardware groups. The purpose of configuring hardware groups is to make it easier to monitor the hardware associated with a particular function (e.g., SSI&T, training, or processing in support of a particular instrument) rather than having to find those items in the default group, which is “All Machines.”

The Production Monitor may define a specific set of machines to be monitored as a group. The Production Monitor must know which machines are to be included in the group and should devise a useful name for the group.

The Production Monitor must have access to UNIX commands in order to perform the procedure.

Configuring Hardware Groups

NOTE: Commands in Steps 1 through 9 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Queuing Server host by typing **/tools/bin/ssh *hostname*** (e.g., **e0sps04**, **g0sps06**, **l0sps03**, or **n0sps08**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **cd /*path*** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/COTS/autotreeb/autouser, /usr/ecs/*MODE*/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., FMR.autosys.csh.g0sps06).
- The particular path to be typed may vary from site to site.

8 Type **source *AUTOSYSINSTANCE*.autosys.csh.*hostname*** then press **Return/Enter**.

9 Type vi xpert.groups.*AUTOSYSINSTANCE* then press Return/Enter.

- The configuration file is displayed by the vi text editor.
- Although this procedure has been written for the vi editor, any UNIX editor can be used to create the machine group file.

10 Using vi editor commands create/modify hardware groups as necessary.

- An example of a hardware group file is shown in Figure 43.
- The first line of each machine group is in the format **groupname**: ***groupname***.
- The name of each machine to be included in the group is on a separate line.
- The following vi editor commands are useful:
  - **h** (move cursor left)
  - **j** (move cursor down)
  - **k** (move cursor up)
  - **l** (move cursor right)
  - **i** (insert text)
  - **x** (delete a character)
  - **u** (undo previous change)
  - **Esc** (switch to command mode)

11 Press the **Esc** key.

12 Type **ZZ**.

- New hardware groups are entered and saved in the file.
- UNIX prompt is displayed.

groupname: Training

g0pls02

g0sps06

g0spg01

groupname: SSI&T

g0ais01

g0sps06

g0spg01

Figure 43. AutoSys Hardware Group File

13 Launch **AutoSys** as described in the procedure for Launching Production Processing Applications.

- The **AutoSys GUI Control Panel** (Figure 39) is displayed.

14 Click on the **HostScape** button.

- The **HostScape** GUI (Figure 40) is displayed.

15 Select **View** → **Select Machine Group** from the pull-down menu.

- The **Machine Group Selection** dialog box is presented.

16 Select (highlight) the machine group to be applied.

- The **machine group** is highlighted.

17 Click on the **OK** button**.**

- The selected **machine group** is applied.
- The **Machine Group Selection** dialog box closes.

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Reviewing Hardware Status, DPR Dependency, DPR Production Timeline, Alarms, and Job Activities

Reviewing Hardware Status

The Production Monitor reviews hardware status using AutoSys. Hardware status is displayed by the AutoXpert HostScape GUI. By checking the hardware status the Production Monitor can determine the status of processors, the condition of the queue, whether any processors are overloaded while others are idle, whether there are any system problems, etc.

HostScape displays jobs on a machine-by-machine basis, indicating which AutoSys server/client machines are up and active, and which jobs are running or have recently run on each machine. HostScape allows the Production Monitor to check hardware status in real-time.

The procedure for reviewing hardware status starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Reviewing Hardware Status

1 Click on the **HostScape** button on the **AutoSys GUI Control Panel**.

- The **HostScape** GUI (Figure 40) is displayed.
- View presented is **Normal** View.

2 Review the Control Region (left side of the display) to identify the color codes for the status of the machines. In the View Region (right side of the display) the color code is displayed on the border of each machine box.

- **MACHINE UP** (active) is green.
- **MACHINE DOWN** (inactive and cannot be reached) is red.
- **MACHINE INACTIVE** is black**.** (The color code is not shown in the Control Region)

3 Review the machine type in the View Region (right side of the display).

- The name of the machine is displayed in the upper left-hand corner of each machine box.
- Server machines are in the first (top) row of the display.
- Event Server name appears below the list of jobs, if applicable.
- Event Processor name appears below the list of jobs, if applicable.
- Client machines are in the subsequent rows of the display.

4 Review the machine boxes in the View Region to determine the status of individual machines.

- The total number of jobs STARTING or RUNNING.
- All jobs RUNNING are listed.
- The View Region is scrollable.

5 Review the **Alarm** indicating buttons of individual machines in the View Region.

- Alarm button is in the upper right-hand corner of the box.
- Red indicates that an alarm has been generated.
- Gray (default color) indicates normal operation.
- If an alarm is present, clicking an alarm button brings up the Alarm Manager (described in a subsequent section).

6 Review the machine connection status in the View Region.

- Solid black line indicates that AutoSys can communicate with the client machine Internet daemon.
- Solid red line indicates that AutoSys cannot communicate with the client machine Internet daemon; however, the daemon does respond to **ping** commands.
- Dashed red line indicates that AutoSys cannot communicate with the client machine; the machine is probably turned off.

7 To exit from **HostScape**, select **File → Exit** from the pull-down menu then click on the **OK** button.

- **HostScape** quits (is closed).

Changing the Hardware Status View

The View Options provide the Production Monitor with the following three methods of viewing hardware status:

- Normal.
- Global.
- Zoom.

In the Normal (default) view three rows of machines with job activities are displayed. In the Global view seven rows of machines but no job activities are displayed. In the Zoom view one machine is displayed in great detail. The details include job name, description, status, and commands.

The Production Monitor selects the Global view to monitor the entire system and uses the Zoom view to focus on a specific machine, especially in case of a malfunction.

The procedure for changing hardware status views starts with the assumption that **AutoSys** is running in the **HostScape** mode with the default **Normal** view displayed.

Changing Hardware Status Views

---

1 Select a machine in the View Region by clicking on its name, then select **View → Select View Level → Global View** from the pull-down menu.

- The **Global** view is displayed.
- Seven rows of machines are displayed.
- No job information is displayed.

2 Select a specific machine by clicking on its name, then select **View → Zoom in Machine** from the pull-down menu.

- The **Zoom** view is displayed.
- A table listing the following data is displayed:
  - **Job Name.**
  - **Description.**
  - **Status.**
  - **Command.**

3 Select **Dismiss**.

- The **Global** view is displayed.

4 Select **View → Select View Level → Normal View** from the pull-down menu.

- The **Normal** view is displayed.
- Three rows of machines are displayed.
- Limited job information is displayed.

Reviewing DPR Dependencies

The Production Monitor reviews DPR dependencies using AutoSys. DPR dependencies are displayed by the AutoXpert JobScape GUI.

JobScape presents a Pert-like view of job processing from a logical (or job dependency) point of view. JobScape depicts both command jobs and box jobs. In addition, it depicts the nesting of jobs within boxes and the dependencies between jobs.

JobScape can be used for monitoring job flow in real-time. It allows the Production Monitor to identify potential problems, try to prevent them from becoming actual problems, stop problem jobs in favor of letting good jobs run, etc.

AutoSys defines job status in the terms listed in Table 7. The different states are color-coded on the JobScape display. However, the codes can be changed. The color codes listed in the table are the default values.

Table 7. Job States

Status	Color Code	Meaning
ACTIVATED	white	The top-level box that the job is in is now in the “running” state but the job itself has not started yet.
STARTING	green	The Event Processor has initiated the start procedure with the Remote Agent. The job is in the process of “coming up.”
RUNNING	green	The job is running. If the job is a box job, “running” means that the jobs within the box may be started (other conditions permitting). If the job is a command job, “running” means that the process is actually running on the remote machine.
SUCCESS	light blue	When the job had completed running, it had an exit code equal to or less than the “maximum exit code for success.” By default, only the exit code “0” is interpreted as “success.” However, a range of values up to the “maximum exit code for success” may be reserved for each job to be interpreted as success. If the job is a box job, “success” means that all jobs within the box had exit codes indicating “success” (default) or the “exit condition for box success” was “true.”
FAILURE	red	When the job had completed running, it had an exit code greater than the “maximum exit code for success.” The default is any non-zero exit code. If the job is a box job, “failure” means that at least one job within the box had an exit code greater than zero (the default meaning) or the “exit condition for box failure” was “true.”
TERMINATED	red	The job terminated while in the “running” state. Termination may be the result of a user sending a “killjob” event, or a job may have been terminated because the job itself (or the box it is in) failed. If the job itself fails, it has a “failure” status rather than a “terminated” status.
RESTART	orange	The job was unable to start due to hardware or application problems and has been scheduled to restart.
QUE_WAIT	yellow	The job can logically run (i.e., all starting conditions have been met); however, there are not enough machine resources available to allow it to run.

Table 7. Job States

Status	Color Code	Meaning
ON_ICE	dark blue	The job is removed from all conditions and logic but is still defined to AutoSys. Operationally it is as though the job had been deactivated. The job remains “on_ice” until it receives the “job_off_ice” event. Downstream dependent jobs behave as though the “on_ice” job ran successfully. A job that is “starting” or “running” cannot be put “on_ice.”
ON_HOLD	dark blue	The job is on hold and will not run until it receives the “job_off_hold” event. Downstream jobs will not run until the job is taken off hold. A job that is “starting” or “running” cannot be put “on_hold.”
INACTIVE	dark blue	The job has not yet been processed. Either the job has never been run or its status was intentionally altered to “turn off” its previous completion status.

The procedure for reviewing DPR Dependencies starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Reviewing DPR Dependencies

---

1 Click on the **JobScape** button on the **AutoSys GUI Control Panel**.

- The **JobScape** GUI (Figure 42) is displayed.

2 Review the Control Region (left side of display) to identify the **True/False** dependency legend.

- **True** is indicated by a **solid** arrow, which indicates that job dependencies have been met.
  - — The solid arrow is the default code for **True**; the codes can be changed.
- **False** is indicated by a **dashed** arrow, which indicates that job dependencies have **not** been met.
- Dependency arrows indicate only that a job dependency exits for a job. They do not define time-related starting conditions, nor do they describe the type of job dependency, e.g., “success,” “started,” or “running.”

3 Review the Job Display to determine the status (color-coded) of DPRs.

- Default colors representing job statuses are listed in Table 7.

4 Review the Job Display to determine the types of jobs:

- Rectangle = **Box Job**.
- Ellipse = **Command Job**.

- Hexagon = **File Watcher Job** (not displayed in ECS implementation of AutoSys).

5 Select a job (for which descendants are to be determined) by placing the mouse cursor on the job and clicking with the **left** mouse button.

- Color of the border around the selected job changes to **yellow**.
- Name of the job appears in the **Current Job Name** area of the Control Region.

6 Review the job's descendants by placing the mouse cursor on the job and clicking and holding the **right** mouse button.

- **Descendants** pop-up menu appears. It has the following entries:
  - — ***jobname***.
  - — **Show Children**.
  - — **Show All Descendants**.
  - — **Hide All Descendants**.
  - — **Show Job Arrows**.
  - — **Hide Job Arrows**.
  - — **Show Box Arrows**.
  - — **Hide Box Arrows**.
  - — **Job Definition**.
  - — **View Dependencies**.
  - — **Set Simulation Overrides** [grayed out].
  - — **Start Job**.
  - — **Kill Job**.
  - — **Force Start Job**.
  - — **On Hold**.
  - — **Off Hold**.
  - — **On Ice**.
  - — **Off Ice**.
- Color of the border around the selected job changes to **yellow**.
- Name of the job appears in the **Current Job Name** area of the Control Region.

7 Select (highlight) **Show Children** from the **Descendants** pop-up menu (release the right mouse button).

- Job's first-level Command and Box Jobs appear.
- Repeat Step 5 to select a different job.

8 Select **Show All Descendants** from the **Descendants** pop-up menu.

- Job's Command and Box Jobs appear for all levels.

9 Select **Hide All Descendants** from the **Descendants** pop-up menu.

- Default view is displayed.
- All descendants are hidden.

10 To exit from **JobScape**, select **File → Exit** from the pull-down menu then click on the **OK** button.

Reviewing the DPR Production Timeline

The Production Monitor reviews the DPR Production Timeline using AutoXpert TimeScape.

TimeScape presents a Gantt-like view of a job processing from a temporal (time-related) point of view. TimeScape depicts all job types; i.e., Command Jobs, Box Jobs, and File Watcher Jobs. It also depicts the nesting of jobs within boxes and the duration of time it will take for jobs to complete. TimeScape is used for monitoring job flow in real-time.

The procedure for reviewing the DPR production timeline starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Reviewing the DPR Production Timeline

---

1 Click on the **TimeScape** button on the **AutoSys GUI Control Panel**.

- The **TimeScape** GUI (Figure 41) is displayed.
- Current time is displayed in red in the View Region (right side of the display).

2 Review the Control Region (left side of display) to identify the **Actual/Projected** legend for making comparisons in the View Region. (Refer to Figure 44.)

- **Projected** is a rectangular (blue filled) graphic, to show average job completion time.
- **Actual** is a striped (white and blue) ribbon, to show how much of the job has completed.
  - — If there is a green stripe, the job is running.

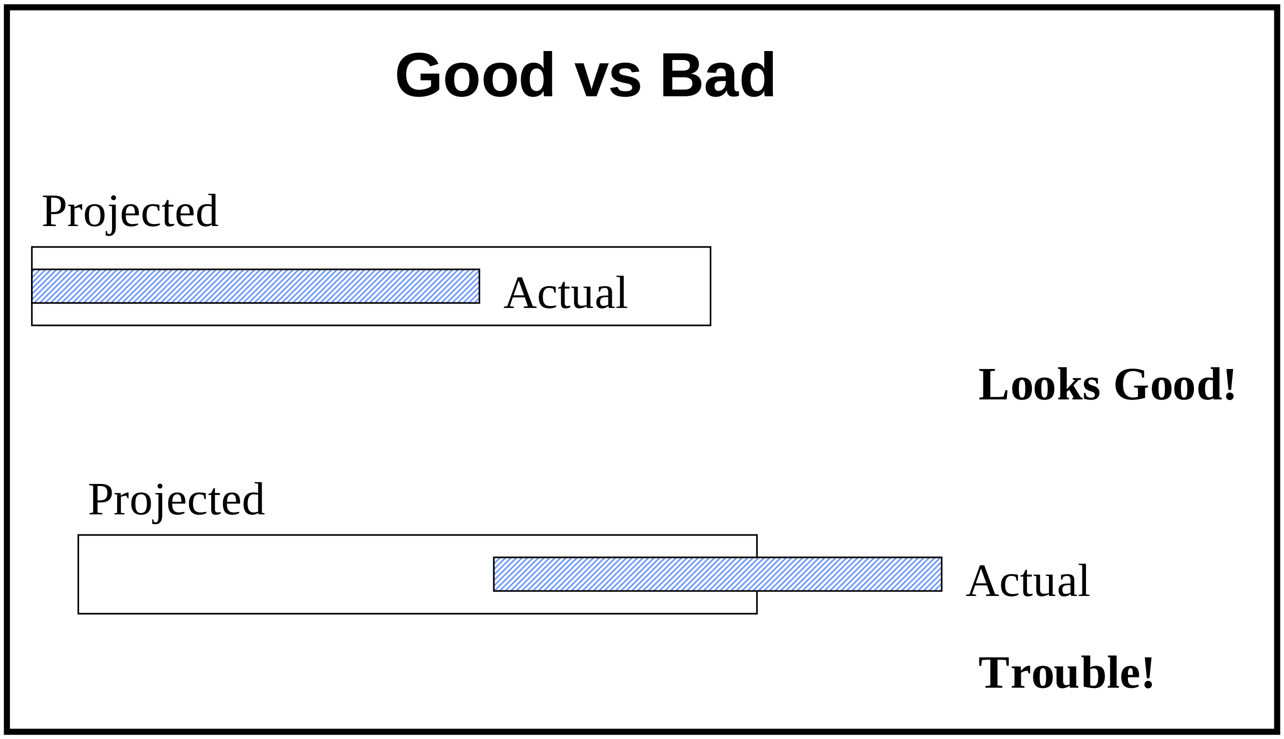

Figure 44. Evaluating Actual versus Projected Job Processing Time

— If there is a black stripe, the job has been completed.

3 Review a job’s descendants by placing the **mouse cursor** on a job and clicking and holding the **right** mouse button.

- **Descendants** pop-up menu appears.
- An asterisk (*) indicates that a Box Job’s descendants have been hidden.

4 Select (highlight) **Show Children** from the **Descendants** pop-up menu and release the mouse button.

- Job’s first-level Command, File Watcher, and Box Jobs appear.
- Return to Step 3 to select a different job.
- Go to Step 5 to change the view.

5 Select (using the right mouse button) **Show All Descendants** from the **Descendants** pop-up menu.

- Job’s Command, File Watcher, and Box Jobs appear with all levels.

6 Select (using the right mouse button) **Hide All Descendants** from the **Descendants** pop-up menu.

- Default view is displayed.
- All descendants are removed.

7 To exit from **TimeScape**, select **File → Exit** from the pull-down menu then click on the **OK** button.

Reviewing Alarms

Alarms indicate problems with job processing. They may involve a failure of job processing, a database problem, a communication problem, hardware or software failure or some other error in the data processing system.

The Production Monitor reviews alarms using the AutoSys Alarm Manager. The Alarm Manager allows the Production Monitor to perform the following functions:

- View alarms as they arrive.
- Provide a response to an alarm.
- Change alarm status.

The Production Monitor can configure the Alarm Manager to display certain types of alarms only. The Production Monitor may wish to see only certain types of alarms (e.g., job failure alarms) or only those alarms that are open (have not yet been acknowledged) or only the alarms that have occurred within the last thirty minutes.

The Production Monitor can select alarms to be displayed based on any or all of the following three criteria:

- Type of alarm
- Alarm state
- Time of the alarm

The procedure for reviewing alarms starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Reviewing Alarms

---

1 Click on the **Ops Console** button on the **AutoSys GUI Control Panel**.

- The **Job Activity Console** GUI, also known as the **Ops Console** GUI, (Figure 45) is displayed.

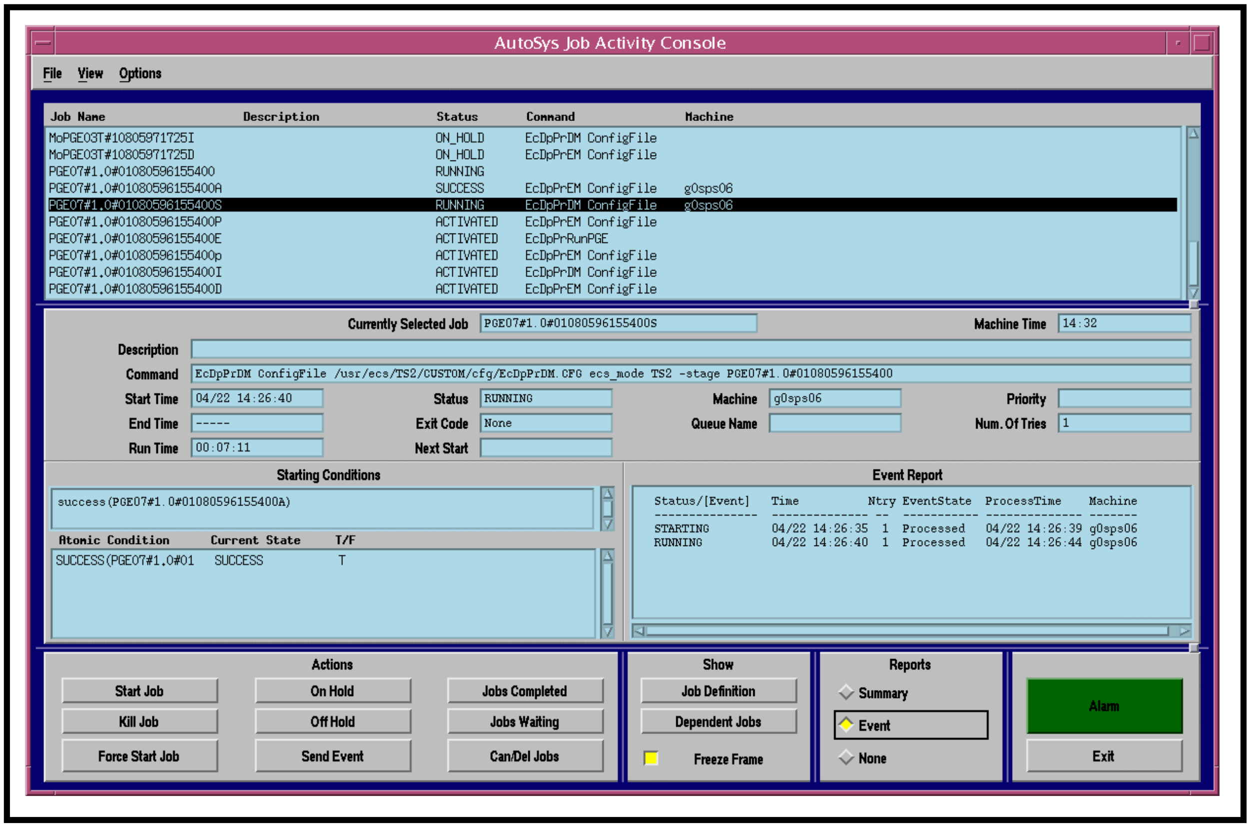

Figure 45. Job Activity Console (Ops Console) GUI

2 Click on the **Alarm b**utton.

- The **Alarm Manager** GUI (Figure 46) is displayed.
- Alarms are displayed in reverse order of occurrence; i.e., the most recent alarm appears at the top of the list.
- The following information is displayed:
  - — **Alarm Type.**
  - — **Job Name.**
  - — **Time.**
  - — **State.**
  - — **Comment**.

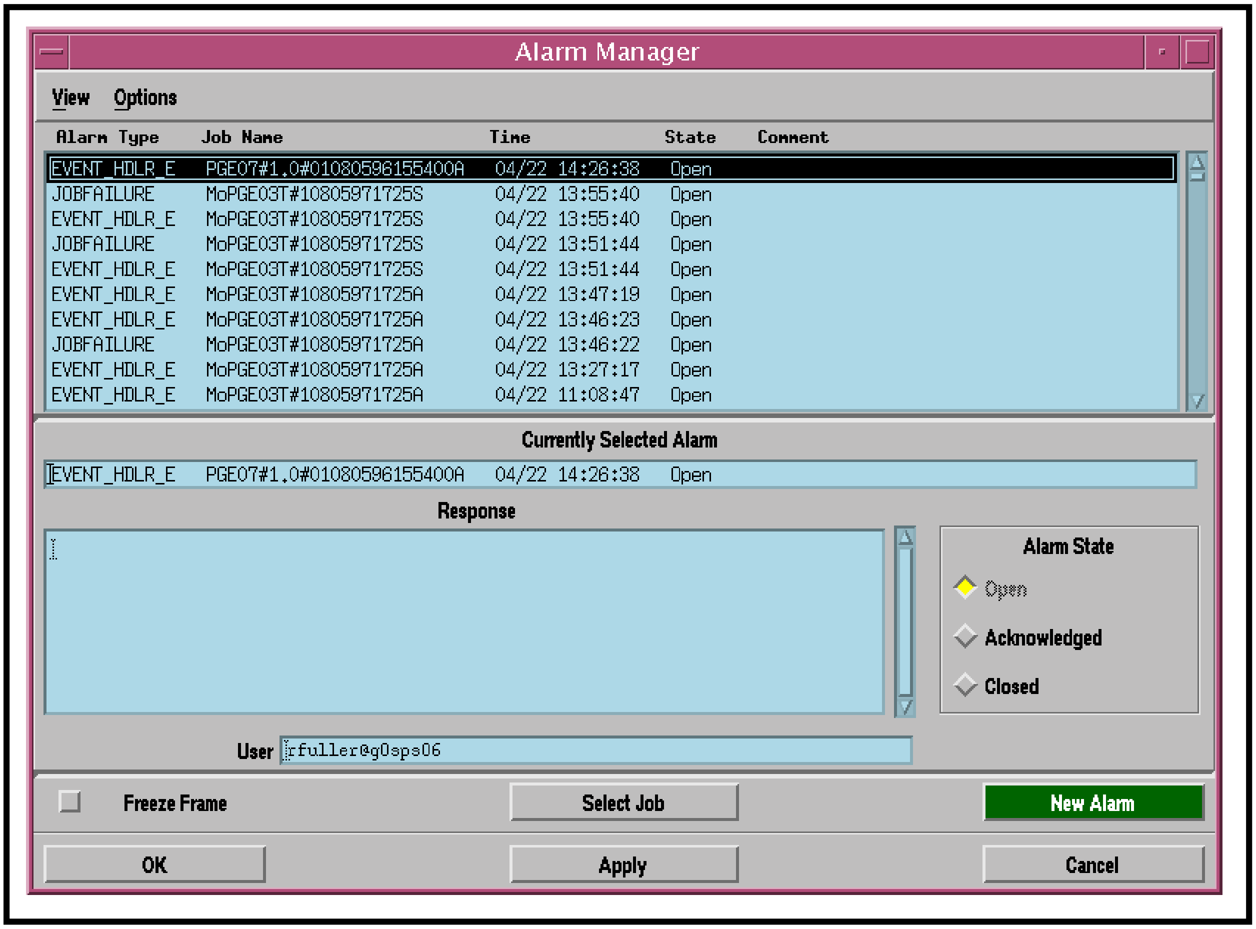

Figure 46. Alarm Manager GUI

3 Click on an alarm in the **Alarm List**.

- Alarm is displayed in detail in the **Currently Selected Alarm** region of the display.
- Table 8 contains descriptions of AutoSys alarms.

4 Click the **Response** edit box and type in a response, if desired, then press the **Tab** key on the keyboard.

- Response is updated on the GUI (but not yet recorded).

5 Update the **Alarm State** by clicking on the radio button that appropriately describes the **Alarm State**.

- The following **Alarm State** radio buttons are available:
  - — **Open.**
  - — **Acknowledged.**

— **Closed**.

- The **Alarm State** is updated on the GUI (but not yet recorded).

Table 8. AutoSys Alarms

ALARM	CODE*	DESCRIPTION
AUTO_PING		The **autoping** command has found a problem in trying to communicate with the Remote Agent on a client machine.
CHASE	514	The **chase** command has found a problem with a job that is supposedly running. The job and problem are listed.
DATABASE_COMM	516	The Remote Agent had trouble sending an event to the database. The job probably ran successfully. Inspect the Remote Agent Log file to determine what happened.
DB_PROBLEM	523	There is a problem with one of the AutoSys databases. This alarm can trigger a user-specified notification procedure.
DB_ROLLOVER	519	AutoSys has rolled over from Dual Server to Single Server Mode. This alarm can trigger a user-specified notification procedure.
DUPLICATE_EVENT	524	Duplicate events have been received in the Event Server. Typically, this means that two Event Processors are running, although “duplicate events” can also be caused by Event Server configuration errors.
EP_HIGH_AVAIL	522	The Event Processor High Availability system has detected some system or network problems. This alarm can trigger a user-specified notification procedure.
EP_ROLLOVER	520	The Shadow Event Processor is taking over processing. This alarm can trigger a user-specified notification procedure.
EP_SHUTDOWN	521	The Event Processor is shutting down. This may be due to a normal shutdown (SEND_EVENT) or due to an error condition. This alarm can trigger a user-specified notification procedure.
EVENT_HDLR_ERROR	507	The Event Processor had an error while processing an event. The job associated with the event should be inspected to see if manual intervention is required.
EVENT_QUE_ERROR	508	An event could not be marked as processed. This is usually due to a problem with the Event Server.
FORKFAIL	501	The Remote Agent was unable to start the user command because it was unable to get a process slot on the machine. AutoSys automatically attempts a RESTART when this happens.
INSTANCE_UNAVAILABLE	525	When different AutoSys instances communicate with each other, this alarm is generated when a receiving AutoSys instance (i.e., its Event Server) cannot be reached. The Event Server is probably down.
JOBFAILURE	503	A job has failed. Its current status is FAILURE.

Table 8. AutoSys Alarms

ALARM	CODE*	DESCRIPTION
JOBNOT_ONICEHOLD	509	To place a job either ON_HOLD or ON_ICE, a JOB_ON_HOLD or JOB_ON_ICE event (as applicable) is sent. There are certain conditions when the job cannot be placed ON_HOLD or ON_ICE (e.g., if it is already running). In such cases the alarm is sent alerting the operator that the job could not be put ON_HOLD or ON_ICE (as applicable).
MAXRUNALARM	510	The job has been running for a time greater than that defined in the Maximum Run Alarm (**max_run_alarm**) field for the job. The job may continue to run; however, a warning alarm is generated.
MAX_RETRYS	505	AutoSys continues attempting to restart a job if there are system problems or if the job is configured for application restarts (**n_retrys**). There is a limit to the number of times it will attempt a restart, as defined in the configuration files (using **MaxRestartTrys**). When that limit has been reached, the MAX_RETRYS alarm is sent to alert operators that AutoSys has given up trying to start the job. After the problem has been fixed the job must be started manually.
MINRUNALARM	502	The job has completed running in a time less than that defined in the Minimum Run Alarm (**min_run_alarm**) field for the job.
MISSING_HEARTBEAT	513	A job has not sent a HEARTBEAT within the interval specified for the job. The operator should inspect the job to determine the cause.
RESOURCE	512	A resource needed for the job was not available. The types of resources are: (a) number of process slots and (b) file space. Specific information about the problem is in the comment associated with the alarm. If AutoSys encounters a resource problem, it attempts to restart the job after a suitable delay.
STARTJOBFAIL	506	AutoSys was unable to start the job. This is generally due to communication problems with the remote machine. AutoSys attempts to restart the job.
VERSION_MISMATCH	518	Generated by the Remote Agent when calling the routine (e.g., Event Processor, **chase**, **clean_files**, **autoping**, etc.) has a different version number than the Remote Agent. Inspect the Remote Agent Log file for the exact version mismatch. The proper Remote Agent version should be installed.

*The code number is used for viewing the event in the event table in the AutoSys database.

6 Click on the appropriate button from the following selections:

- **OK** - to enter all alarm responses and dismiss the **Alarm Manager** GUI.
  - — **Job Activity Console (Ops Console)** GUI is displayed.

- **Apply -** to enter all alarm responses without dismissing the **Alarm Manager** GUI.
    - Repeat Steps 3 through 6 as necessary to review and update additional alarms.
- **Cancel -** to return to the **Job Activity Console (Ops Console)** GUI without entering any alarm responses.
    - **Job Activity Console (Ops Console)** GUI is displayed.

7 To exit from the **Job Activity Console (Ops Console)** GUI click on the **Exit** button then on the **OK** button.

By configuring the AutoSys Alarm Manager the Production Monitor can control which alarms are displayed. Alarms can by selected by type, state, or time.

The procedure for configuring the Alarm Manager starts from the assumption that the **Alarm Manager** is currently running.

Configuring Alarm Selection

---

1 Select **View → Select Alarms** from the pull-down menu of the **Alarm Manager** GUI.

- **Alarm Selection** GUI (Figure 47) is displayed.
- **Alarm Selection** has the following defaults:
    - **All Types** for **Select by Type.**
    - **Open** and **Acknowledge** for **Select by State.**
    - **All Times** for **Select by Time.**

2 To select a single type of alarm, click on the desired alarm in the **Select by Type** alarm list; to select all types of alarms, click on the **All Types** button.

- Desired alarm type is selected.
- If **All Types** are selected, the **All Types** button color changes to yellow.

3 To select multiple types of alarms: press and **hold** the **Control (Ctrl)** key on the keyboard while clicking the desired alarms in the **Select by Type** alarm list.

- Multiple alarms are selected.

4 To select all alarm states click on the **All States** button; to select alarms by state click on whichever of the **Select by State** toggle button(s) properly describe(s) the state(s) to be selected.

- The following **Select by State** toggle buttons are available:
    - **Open.**

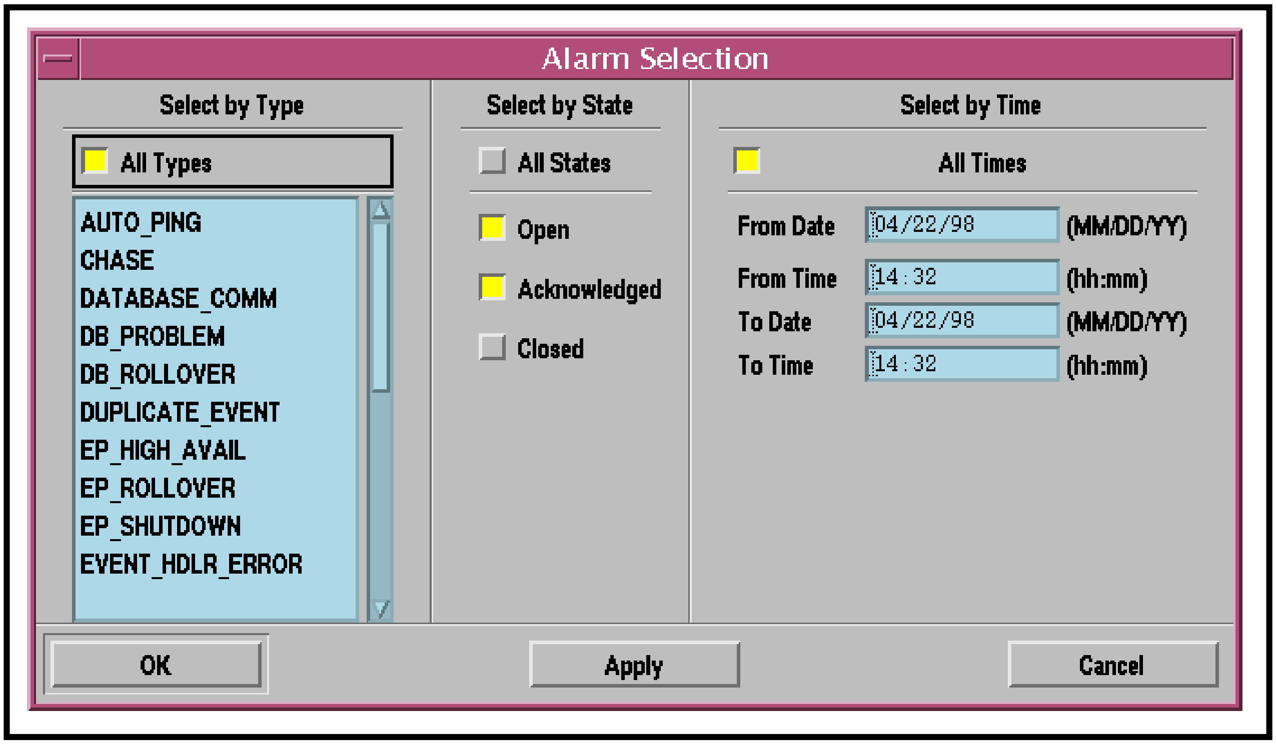

Figure 47. Alarm Selection GUI

- **Acknowledge.**
- **Closed.**

- Any or all of the buttons in the preceding list can be selected.
- The color of selected button(s) change(s) to yellow.

5 To select all times click on the **All Times** button.

6 To select alarms by time perform Steps 7 through 10; otherwise, go to Step 11.

7 Type the starting date (in *MM/DD/YY* format) in the **From Date** field and press the **Tab** key on the keyboard to advance to the next field.

- Starting date is entered.
- If **All Times** have been selected, proceed to Step 9.

8 Type the starting time (in *hh:mm* format) in the **From Time** field and press the **Tab** key on the keyboard to advance to the next field.

- Starting time is entered.

9 Type the end date (in *MM/DD/YY* format) in the **To Date** field, and press the **Tab** key on the keyboard to advance to the next field.

- End date is entered.

10 Type the end time (in *hh:mm* format) in the **To Time** field.

- End time is entered.

11 When the **Alarm Selection** GUI contains the desired set of alarm display criteria, click on the appropriate button from the following selections:

- **OK** - to accept all specified alarm selections and dismiss the **Alarm Selection** GUI.
  - **Alarm Manager** GUI is displayed.
- **Apply** - to accept all specified alarm selections without dismissing the **Alarm Selection** GUI.
  - Repeat Steps 2 through 11 as necessary to specify additional alarm selection criteria.
- **Cancel** - to dismiss the **Alarm Selection** GUI without accepting any alarm selections.
  - **Alarm Manager** GUI is displayed.

12 If alarm sound is desired, select **Options** → **Sound On** from the pull-down menu of the **Alarm Manager** GUI.

- **Sound On** toggle button is yellow when the sound is on.

13 If no alarms are to be reviewed, click on the **OK** button to exit from the **Alarm Manager** GUI.

- **Alarm Manager** quits (is closed).
- **Job Activity Console (Ops Console)** GUI is displayed.

Specifying Job Selection Criteria

The Production Monitor reviews job activities using the AutoSys Job Activity Console as described in the section of the lesson that follows this one. The AutoSys Job Selection GUI is used for specifying (filtering) the jobs to be reviewed, including setting the criteria for displaying jobs by name, status and/or machine.

The procedure for specifying job selection criteria starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Specifying Job Selection Criteria

1 Click on the **Ops Console** button on the **AutoSys GUI Control Panel**.

- The **Job Activity Console** GUI, also known as the **Ops Console** GUI, (Figure 45) is displayed.

2 Select **View** → **Select Jobs** from the pull-down menu.

- The **Job Selection** GUI (Figure 48) is displayed.
- **Job Selection** has the following default values:
  - **All Jobs/Job Name** for **Select by Name.**
  - **All Statuses** for **Select by Status.**
  - **All Machines** for **Select by Machine.**
  - **Unsorted** for **Sort Order.**

3 To select all jobs click on the **All Jobs** button.

- When the **All Jobs** option is selected, the **All Jobs** button color changes to yellow.

4 To select a particular job by name, type the name of the desired job in the **Job Name** field.

- When typing in either the **Job Name** field or the **Box Name** field, the corresponding toggle button is automatically turned on. (You do not have to click on the button, just start typing in the desired field.)
- The asterisk (*) wildcard character can be used for entering a partial job or box name (e.g., *.ceres*)

5 To select a particular box by name, type the name of the desired box in the **Box Name** field then type in the **Box Levels** field how many levels of nesting you want to view for the box job.

- In the **Box Levels** field any valid positive integer can be entered or the word "all."
  - 0 - indicates that only the top-level box specified in the **Box Name** field is to be displayed.
  - 1 - indicates that the specified top-level box and all direct descendant boxes and enclosed jobs are to be displayed.
  - all - indicates that all jobs in the box are to be displayed.

6 To select all job statuses click on the **All Statuses** button.

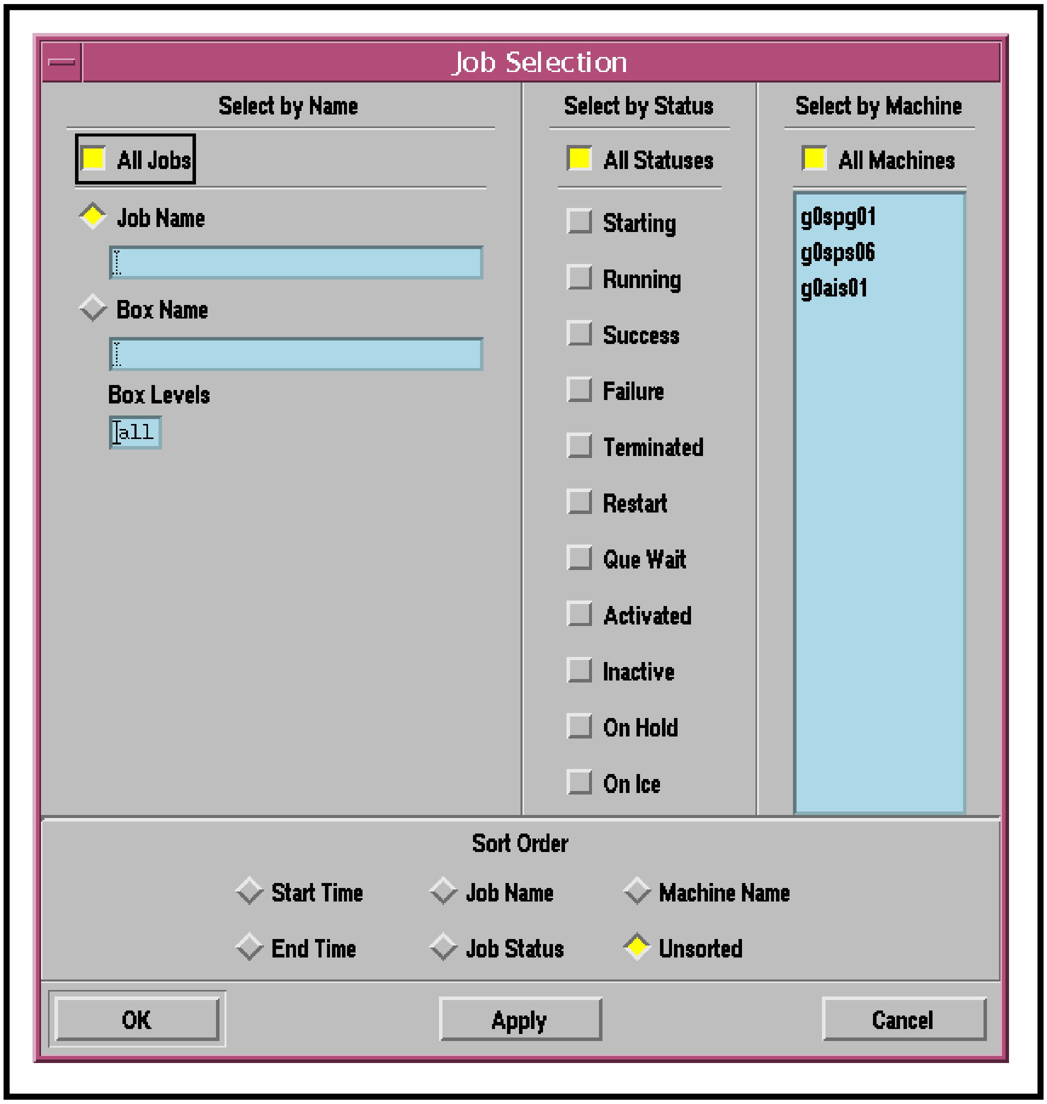

Figure 48. Job Selection GUI

7 To select jobs by status click on whichever of the following **Select by Status** toggle buttons properly describe(s) the status(es) to be selected:

- **Starting**.
- **Running**.
- **Success**.
- **Failure**.
- **Terminated**.
- **Restart**.

- **Que Wait**.
- **Activated**.
- **Inactive**.
- **On Hold**.
- **On Ice**.

8 To select all machines click on the **All Machines** button.

- **All Machines** button turns yellow.

9 To select jobs by the particular machine click on the name of the desired machine in the **Select by Machine** list.

- To select multiple machines, click and hold on the first machine then drag the cursor to the name of the last machine to be selected and release the mouse button.
- Selected machine(s) is (are) highlighted.

10 Click on the desired order in the **Sort Order** area.

- The following options are available for **Sort Order**:
  - **Start Time.**
  - **End Time.**
  - **Job Name.**
  - **Job Status.**
  - **Machine Name.**
  - **Unsorted.**

11 When the **Job Selection** GUI contains the desired set of job selection criteria, click on the appropriate button from the following selections:

- **OK** - to accept all specified job selection criteria and dismiss the **Job Selection** GUI.
  - **Job Activity Console** GUI is displayed.
  - Job list based on the specified selection criteria is displayed in the **Job List** region of the **Job Activity Console**.
- **Apply** - to accept all specified job selection criteria without dismissing the **Job Selection** GUI.
  - Repeat Steps 3 through 11 as necessary to specify additional job selection criteria.
- **Cancel** - to dismiss the **Job Selection** GUI without accepting any job selection criteria.

— **Job Activity Console** GUI is displayed

Reviewing Job Activities

The Production Monitor reviews job activities using AutoSys. The Job Activity Console is the primary interface that allows the operator to monitor all jobs that have been defined for AutoSys. The Job Selection GUI (described in the preceding section) is used for defining the criteria for displaying jobs on the Job Activity Console.

The procedure for reviewing job activities starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Reviewing Job Activities

1 Click on the **Ops Console** button on the **AutoSys GUI Control Panel**.

- The **Job Activity Console** GUI, also known as the **Ops Console** GUI, (Figure 45) is displayed.

2 Generate a list of jobs to be displayed on the **Job Activity Console** GUI by performing the procedure for **Specifying Job Selection Criteria** (preceding section of this lesson).

- Job list based on the specified selection criteria is displayed in the **Job List** region of the **Job Activity Console**.

3 Review the **Job List** region of the **Job Activity Console**.

- The following job characteristics are displayed in a table:
  - — **Job Name**.
  - — **Description.**
  - — **Status.**
  - — **Command.**
  - — **Machine.**

4 Click anywhere on a job row in the **Job List** region to have detailed information for that job displayed in the **Currently Selected Job** region of the display.

5 Review the data in the **Currently Selected Job** region of the display.

- The following job details are displayed in the **Currently Selected Job** region of the **Job Activity Console**:
  - — Job name (**Currently Selected Job**).
  - — **Machine Time** (current time or time at which the frame was frozen)**.**

— **Description**.

— **Command**.

— **Start Time** (and date).

— **End Time** (and date).

— **Run Time**.

— **Status**.

— **Exit Code**.

— **Next Start**.

— **Machine**.

— **Queue Name**.

— **Priority**.

— **Num. of Tries**.

6 Review the data in the **Starting Conditions** region of the display.

- The following job starting conditions are displayed:

  — overall starting conditions (including all atomic conditions).

  — Identification of each **Atomic Condition**.

    · **Current State.**

    · **T/F** (true or false).

- The starting conditions can be useful in determining what "upstream" job may be preventing the currently selected job from running.

- An **Atomic Condition** is one of the most basic components of an overall starting condition; for example, if SUCCESS(JOB_X) and SUCCESS(JOB_Y) define the overall starting condition for a job, there are two atomic conditions, one of which is SUCCESS(JOB_X) and the other of which is SUCCESS(JOB_Y).

- The **T/F** (true/false) flag indicates whether the corresponding atomic condition has been satisfied.

- Clicking on one of the **Atomic Conditions** causes the job associated with that condition to become the currently selected job, with its details displayed in the **Currently Selected Job** region of the display. By checking the atomic conditions, it is possible to check the path of upstream dependencies to determine which job (if any) is preventing a particular job from running.
  - Figure 49 shows how atomic conditions relate to job dependencies as displayed using JobScape. (In this case DPR3 and DPR12 are atomic conditions for DPR45.)
  - Note that clicking on one of the atomic conditions listed on the Job Activity Console does **not** actually cause the JobScape GUI to be displayed.

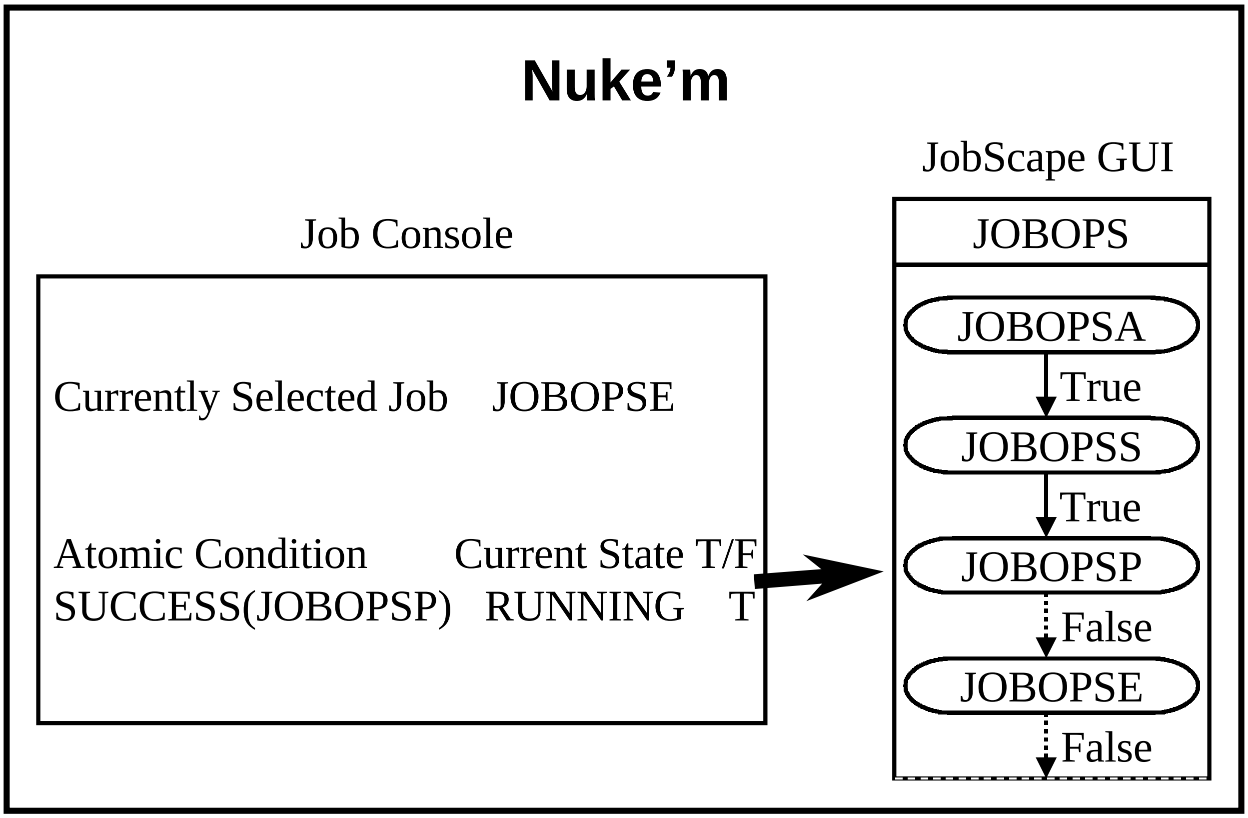

Figure 49. Atomic Conditions and Upstream Dependencies

7 In the **Reports** list click on the type of report to be reviewed then review the report in the **Event Report** region of the display:

- The following types of reports can be selected:
  - **Summary**, which shows the result of the last execution of the job including the following types of information:
    - Job Name
    - Last Start
    - Last End
    - Status
    - Run
    - Pri/Xit
  - **Event**, which lists all events from the last execution of the job including the following types of information:
    - Status [Event]
    - Time
    - Ntry [number of tries]
    - EventState [e.g., “Processed”]
    - ProcessTime
    - Machine
  - **None**.
- The selected report is displayed. The color of the button corresponding to the selected report changes to yellow.
- For a better view of a report, it is possible to expand the size of the GUI by grabbing a corner of the GUI with the mouse cursor and resizing as desired.

8 When all job activities have been adequately reviewed, click on the **Exit** button to quit the **Job Activity Console** display.

- AutoSys **Job Activity Console Exit** GUI is displayed to confirm the decision to quit the display.
- Subsequent sections of this lesson describe features that are accessible through the **Actions** and **Show** regions of the **Job Activity Console**.
- Use and configuration of **Alarm** functions were described in previous sections.

9 Click on the **OK** button.

- AutoSys **Job Activity Console** GUI quits (is closed).

Modifying Job Status

Methods for Modifying Job Status

At times the Production Monitor may need to modify a particular job in any of the following ways:

- Start the job.
- Kill the job.
- Force the job to start.
- Place the job on hold.
- Take the job off hold.

The Production Monitor has the option of the following three methods for making those types of modifications to a particular job:

- Buttons in the **Actions** region of the **Job Activity Console (Ops Console)**.
- Menu accessed by clicking the **right** mouse button on the relevant job name on either the **JobScape** or **TimeScape** GUI.
- AutoSys **Send Event** GUI.

In addition to the previously mentioned modifications to job status, the buttons in the **Actions** region of the **Job Activity Console (Ops Console)** allow the Production Monitor to generate one of the following types of reports:

- Jobs Completed (Figure 50).
- Jobs Waiting (Figure 51).

The menu accessed using the right mouse button on one of the AutoXpert GUIs allows the Production Monitor to initiate either of the following actions (in addition to the previously mentioned modifications to job status):

- Put the job on ice.
- Take the job off ice.

The **Send Event** GUI (Figure 52) allows the Production Monitor to initiate a very broad range of actions, including any of the following items:

- Start the job.
- Kill the job.

```
############################
##### JOBS COMPLETED #######
############################
```

DPR ID	COMPLETION STATE	PRIORITY
ACT#syn1#004130123OPS	SUCCESS	250
AM1Eph#2.007310420OPS	SUCCESS	250
BTS#syn1#004130123OPS	SUCCESS	250
ETS#syn1#004130123OPS	SUCCESS	250

Figure 50. Jobs Completed Report

```
###########################
##### JOBS WAITING   #######
###########################
```

DPR ID	COMPLETION STATE	PRIORITY	PREDICTED START TIME
AM1Eph#2.007310620OPS	CQ_HOLD	250	10/27/98 18:44:01.000
AM1Eph#2.007310820OPS	CQ_HOLD	250	10/27/98 18:44:16.000
AM1Eph#2.007311020OPS	CQ_HOLD	250	10/27/98 18:44:31.000
AM1Eph#2.007311220OPS	CQ_HOLD	250	10/27/98 18:44:43.000

Figure 51. Jobs Waiting Report

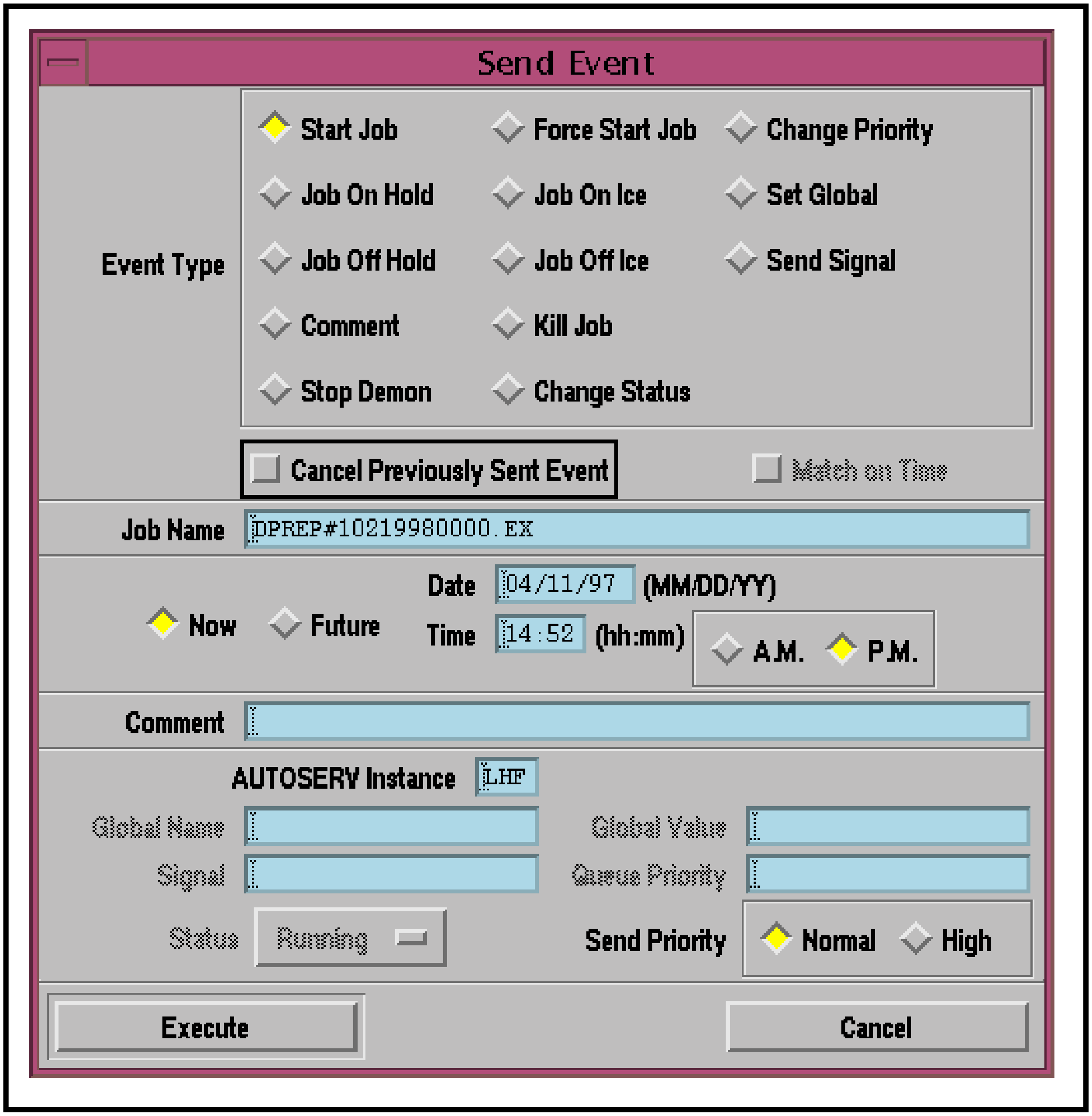

Figure 52. Send Event GUI

- Force the job to start.
- Place the job on hold.
- Take the job off hold.
- Change the job's status.
- Change the job's queue priority.

- Put the job on ice.
- Take the job off ice.
- Stop the daemon (stop the Event Processor in an emergency).
- Set a global value.
- Send a signal concerning the job.
- Make a comment (for example, why a job start was forced).

In any case the Production Monitor may implement certain changes of job status only when the Production Monitor "owns" the job affected by the modification.

Determining the Ownership of an AutoSys Job

AutoSys is very much ownership-aware. Only the "owner" of a job has "edit" privileges and can make changes to the status of an owned job.

AutoSys recognizes ownership in terms of two factors:

- UserID.
- Machine where the operator (user) logged in.

For example, **cmshared@g0sps06** identifies the Production Monitor who logged in as "cmshared" at machine g0sps06. Any operator who logs in as "cmshared" at another machine (e.g., g0pls01) would not be able to change the status of a job "owned" by **cmshared@g0sps06**. Consequently, to have any real effect on a job first it is necessary to log in as the job's owner and launch the AutoSys GUIs as that owner.

The procedure for determining the ownership of a job starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

Determining the Ownership of an AutoSys Job

---

1 Click on the **JobScape** button on the **AutoSys GUI Control Panel**.

- The **JobScape** GUI (Figure 42) is displayed.
- The **TimeScape** GUI (Figure 41) may be used instead of the **JobScape** GUI.

2 Place the mouse cursor on the relevant job and click and hold the **right** mouse button.

- **Descendants** pop-up menu appears. It has the following entries:
  - — ***jobname*.**
  - — **Show Children.**
  - — **Show All Descendants.**

— **Hide All Descendants.**

— **Show Job Arrows.**

— **Hide Job Arrows.**

— **Show Box Arrows.**

— **Hide Box Arrows.**

— **Job Definition.**

— **View Dependencies.**

— **Set Simulation Overrides** [grayed out].

— **Start Job.**

— **Kill Job.**

— **Force Start Job.**

— **On Hold.**

— **Off Hold.**

— **On Ice.**

— **Off Ice.**

3 Select (highlight) **Job Definition** from the **Descendants** pop-up menu (release the right mouse button).

- The **Job Definition** GUI (Figure 53) is displayed.

4 Review the entry in the **Owner** field of the **Job Definition** GUI.

- Job owner is identified in the **Owner** field of the **Job Definition** GUI.
- Job name is listed in the **Job Name** field of the **Job Definition** GUI.

NOTE: Jobs should **not** be deleted using the AutoSys **Job Definition** GUI because it does not communicate with the PDPS database.

5 To exit from the **Job Definition** GUI, click on the **Exit** button.

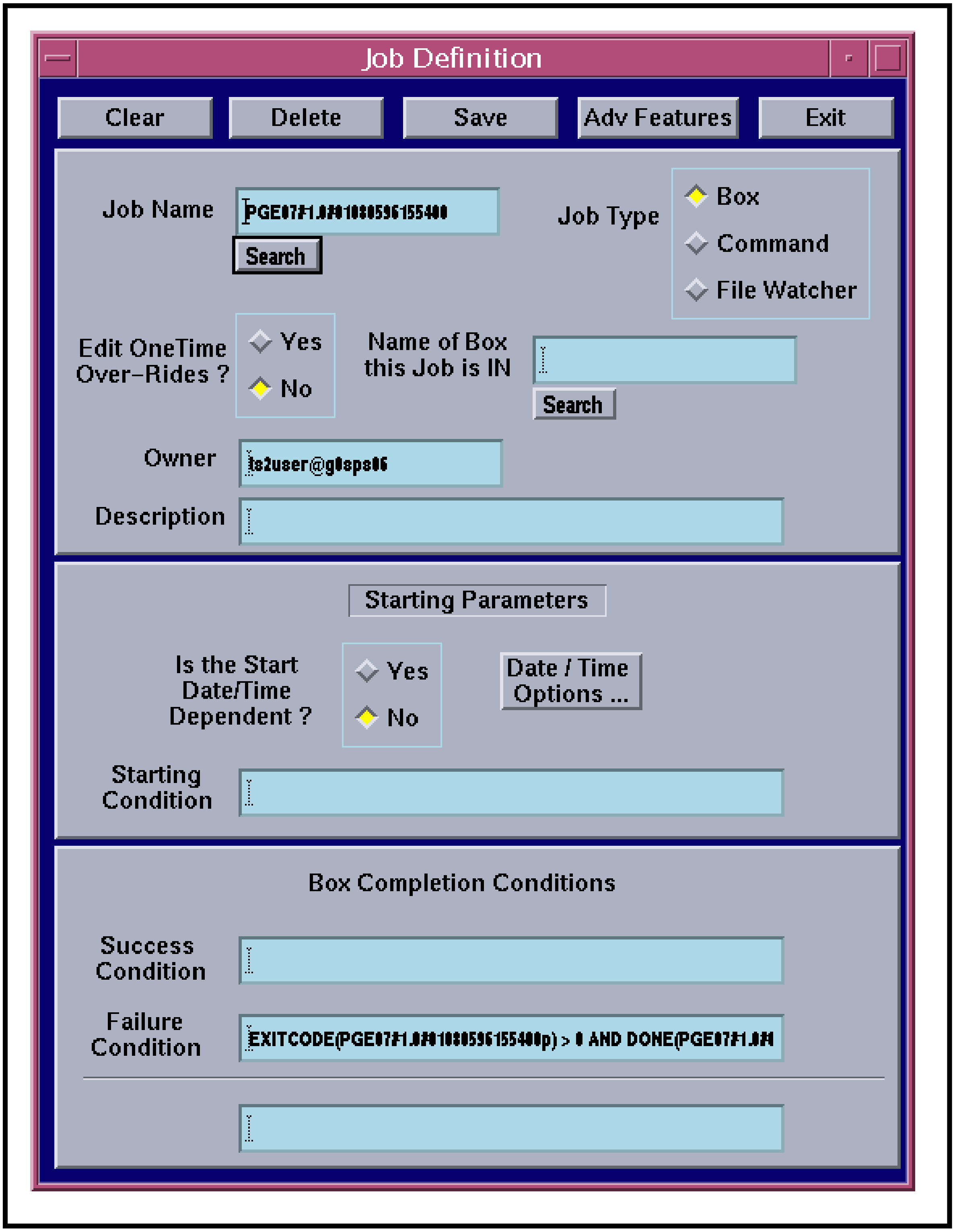

Figure 53. Job Definition GUI

Sending an Event to a Job

The procedure for sending an event to a job using the **Send Event** GUI starts with the assumption that all applicable servers are currently running and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

CAUTION

Once an event has been sent from the **Send Event** dialog, it may not be possible to cancel or modify it.

Sending an Event to a Job

---

1 Click on the **Ops Console** button on the **AutoSys GUI Control Panel**.

- The **Job Activity Console** GUI, also known as the **Ops Console** GUI, (Figure 45) is displayed.

2 Generate a list of jobs to be displayed on the **Job Activity Console** GUI by performing the procedure for **Specifying Job Selection Criteria**.

- Job list based on the specified selection criteria is displayed in the **Job List** region of the **Job Activity Console**.

3 Review the **Job List** region of the **Job Activity Console** to identify the job with the status to be modified.

4 In the **Job List** region of the **Job Activity Console** click on the job row corresponding to the job with the status to be modified.

5 In the **Actions** region of the **Job Activity Console** click on the button corresponding to the desired action to be taken with respect to the selected job (if there is a corresponding button).

- **Actions** region of the **Job Activity Console** has the following buttons.
  - — **Start Job.**
  - — **Kill Job**
  - — **On Hold** (Put job on hold)**.**
  - — **Off Hold** (Take job off hold)**.**
  - — **Force Start Job.**
  - — **Send Event** (Send an event (signal) to a job)**.**
  - — **Jobs Completed** (Display a “Jobs Completed” report)**.**
  - — **Jobs Waiting** (Display a “Jobs Waiting” report)**.**

- **Client Tool** (Perform Job Management Client functions – described in a subsequent section of the lesson)**.**

- If one of the following buttons was selected, the procedure has been completed:
  - **Start Job.**
  - **Kill Job**
  - **On Hold** (Put job on hold)**.**
  - **Off Hold** (Take job off hold)**.**
  - **Force Start Job.**
  - **Jobs Completed** (Display a "Jobs Completed" report)**.**
  - **Jobs Waiting** (Display a "Jobs Waiting" report)**.**
- If there is no button corresponding to the desired action, modify job status using the **Send Event** GUI (continue with the next step).

6 Click on the **Send Event** button if there is no other button corresponding to the desired action in the **Actions** region of the **Job Activity Console** GUI.

- The **Send Event** GUI (Figure 52) is displayed.
- **Send Event** has the following default values.
  - **Start Job** for **Event Type**.
  - **Now** for **Time**.
  - **Normal** for **Send Priority**.

7 Verify that the correct job is listed in the **Job Name** field of the **Send Event** GUI.

- If not, click on the **Cancel** button and select the correct job (perform Steps 2 through 6).

8 Click on **Event Type** to select the desired type of job status to be modified.

- **Event Type** has the following options.
  - **Start Job.**
  - **Job On Hold.**
  - **Job Off Hold.**
  - **Comment.**
  - **Stop Demon.**
  - **Force Start Job.**
  - **Job On Ice.**

— **Job Off Ice.**

— **Kill Job.**

— **Change Status.**

— **Change Priority**.

— **Set Global**.

— **Send Signal**.

- Remember that a job with status of either “starting” or “running” cannot be put “on hold” or “on ice.”

- Note that the GUI has an option to **Cancel Previously Sent Event**.

9 To enter the desired date and time when the job status is to be modified, either right away or at some time in the future**,** click on either **Now** or **Future.**

- Select **Now** for immediate execution. (Current date and time are default values.)

- Select **Future** for a future date and time.

10 If **Future** was selected in the previous step, perform Steps 10 through 12; otherwise go to Step 13.

11 Type the date (in *MM/DD/YY* format) for future execution in the **Date** field.

12 Type the time (in *hh:mm* format) for future execution in the **Time** field.

13 Click on either **A.M.** or **P.M.** as appropriate.

14 Type any comments in the **Comment** field.

- **Comment** is a free-form field for entering text that should be associated with the event in the database.

  — For example, explain why the selected “send event” was initiated.

15 Review the **AUTOSERV Instance** field.

- **Instance** field specifies the instance of AutoSys/AutoXpert to which the event will be sent. (You can send events to instances of AutoSys/AutoXpert other than the one you are running.)

- The current AutoSys/AutoXpert instance should be displayed by default in the **AUTOSERV Instance** field.

- If the event specified in the **Event Type** field should be sent to a different instance of AutoSys/AutoXpert, type the name of the other instance in the **AUTOSERV Instance** field.

16 Review the **Global Name** and **Global Value** fields.

- **Global Name** and **Global Value** are accessible only if **Set Global** was selected in the **Event Type** region.
- If **Set Global** was specified in the **Event Type** field, type the appropriate entries in the **Global Name** and **Global Value** fields.

17 Review the **Signal** field.

- **Signal** is accessible only if **Send Signal** or **Kill Job** was selected in the **Event Type** region.
- If either **Send Signal** or **Kill Job** was specified in the **Event Type** field, type the appropriate signal **number(s)** in the **Signal** field.
  - Table 9 is a list of UNIX signals.

18 Review the **Queue Priority** entry.

- Queue priority can be changed only if **Change Priority** was selected in the **Event Type** region.
- If the queue priority is to be changed, type the new priority in the **Queue Priority** field.
- The queue priority is not relevant to box jobs (DPR-level jobs).

19 Review the **Status** option menu.

- Status can be changed only if **Change Status** was selected in the **Event Type** region.
- Click on the **Status** button and select (from the pick-list) the job status to which the job should be changed.
- **Status** has the following options.
  - **Running.**
  - **Success.**
  - **Failure.**
  - **Terminated.**
  - **Starting.**
  - **Inactive.**

20 Review the **Send Priority** radio buttons.

- Send priority refers to the priority for sending the event (not the job priority).
- If the send priority is to be changed, click on the button corresponding to the desired send priority.

- **Send Priority** has the following options.
  - **Normal.**
  - **High.**
- **High** priority is reserved for emergencies.

Table 9. UNIX Signals

NAME	VALUE	DEFAULT	EVENT
HUP	1	Exit	Hangup.
INT	2	Exit	Interrupt.
QUIT	3	Core	Quit.
ILL	4	Core	Illegal Instruction.
TRAP	5	Core	Trace/Breakpoint Trap.
ABRT	6	Core	Abort.
EMT	7	Core	Emulation Trap.
FPE	8	Core	Arithmetic Exception.
KILL	9	Exit	Killed.
BUS	10	Core	Bus Error.
SEGV	11	Core	Segmentation Fault.
SYS	12	Core	Bad System Call.
PIPE	13	Exit	Broken Pipe.
ALRM	14	Exit	Alarm Clock.
TERM	15	Exit	Terminated.
USR1	16	Exit	User Signal 1.
USR2	17	Exit	User Signal 2.
CHLD	18	Ignore	Child Status Changed.
PWR	19	Ignore	Power Fail/Restart.
WINCH	20	Ignore	Window Size Change
URG	21	Ignore	Urgent Socket Condition.
POLL	22	Exit	Pollable Event.
STOP	23	Stop	Stopped (signal).
TSTP	24	Stop	Stopped (user).
CONT	25	Ignore	Continued.
TTIN	26	Stop	Stopped (tty input).
TTOU	27	Stop	Stopped (tty output).
VTALRM	28	Exit	Virtual Timer Expired
PROF	29	Exit	Profiling Timer Expired.
XCPU	30	Core	CPU time limit exceeded.
XFSZ	31	Core	File size limit exceeded.
WAITING	32	Ignore	Concurrency signal reserved by threads library
LWP	33	Ignore	Inter-LWP signal reserved by threads library.

Table 9. UNIX Signals

NAME	VALUE	DEFAULT	EVENT
FREEZE	34	Ignore	Check point Freeze
THAW	35	Ignore	Check point Thaw
CANCEL	36	Ignore	Cancellation signal reserved by threads library.
RTMIN	*	Exit	First real time signal
(RTMIN+1)	*	Exit	Second real time signal
(RTMAX-1)	*	Exit	Second-to-last real time signal.
RTMAX	*	Exit	Last real time signal

*The symbols RTMIN through RTMAX are evaluated dynamically in order to permit future configurability.

21 Click on the **Execute** button then click on the **Yes** button to enable the modified event.

- **Job Activity Console (Ops Console)** GUI is displayed.
- Once an event has been sent from the **Send Event** dialog, it may not be possible to cancel or modify it.

Canceling a Sent Event

It may be possible to cancel an event sent to an AutoSys job, especially if the event was previously scheduled for *sometime in the future*.

The Production Monitor uses the AutoSys **Send Event** GUI to cancel an event sent to a job. The procedure starts with the assumption that all applicable servers are currently running and the **Job Activity Console** GUI (Figure 45) is being displayed.

Canceling a Sent Event

---

1 Click on the **Send Event** button in the **Actions** Region of the **Job Activity Console**.

- The **Send Event** GUI (Figure 52) is displayed.

2 Click on **Event Type** to select the type of event that was sent to the job and is to be canceled.

3 Click on the **Cancel Previously Sent Event** radio button.

4 Verify that the correct job is listed in the **Job Name** field of the **Send Event** GUI.

- Type the job name in the **Job Name** field if necessary.
- **Not** necessary for the following types of events:

- SET_GLOBAL
- STOP_DEMON
- ALARM
- COMMENT

5 Click on the **Execute** button then click on the **Yes** button to enable the modified event.

- The event is cancelled.
- **Job Activity Console (Ops Console)** GUI is displayed.

Performing Job Management Client Functions

The Job Management Client tool is a set of utility programs intended primarily for use by software developers. However, if necessary, it is possible to gain access to the following Job Management Client functions from AutoSys by clicking on the **Client Tool** button in the **Actions** region of the **Job Activity Console** (Figure 45):

- Create DPR Job.
- Release DPR Job.
- Cancel DPR Job.
- Change DPR ID.
- View Job Management DPR Queue.
- Create Ground Event Job.
- Cancel Ground Event Job.

The Production Monitor starts the process of performing Job Management Client functions from the AutoSys **Job Activity Console** (**Ops Console**). The procedure starts with the assumption that all applicable servers are currently running and the AutoSys **Job Activity Console** (Figure 45) is being displayed.

Performing Job Management Client Functions

1 Verify that the job with the status to be modified is listed in the **Currently Selected Job** field of the **Job Activity Console** (**Ops Console**) .

- Click on the job row in the **Job List** region of the **Job Activity Console** if necessary.
  - Information concerning the selected job is displayed in the **Currently Selected Job** region of the **Job Activity Console** (Figure 45).

2 Click on the **Client Tool** button in the **Actions Region** of the **Job Activity Console**.

- The **Ready to Invoke** (Job Management Client) dialog box (Figure 54) is displayed.

3 Click on the **yes** button.

- The dialog box closes.
- The **Job Activation User Interface** window (Figure 55) is displayed.
- The following menu options are displayed:

  — **0) Exit**
  1) Create Dpr Job
  2) Release Dpr Job
  3) Cancel Dpr Job
  4) Change Dpr Id
  5) View Job Management Dpr Queue
  6) Create Ground Event Job
  7) Cancel Ground Event Job

4 **Enter** the number corresponding to the desired function at the **enter an option** prompt.

5 **Enter** responses to Job Management Client prompts.

6 Enter **0** at the **enter an option** prompt to quit the Job Management Client.

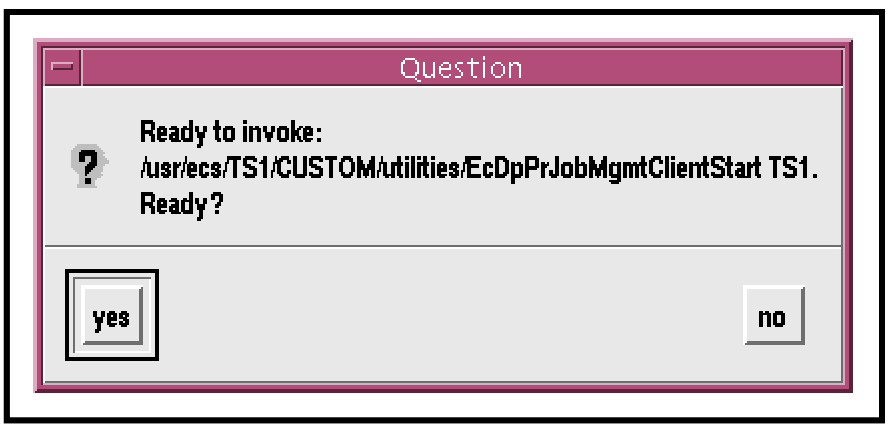

Figure 54. Ready to Invoke (Job Management Client) Dialog Box

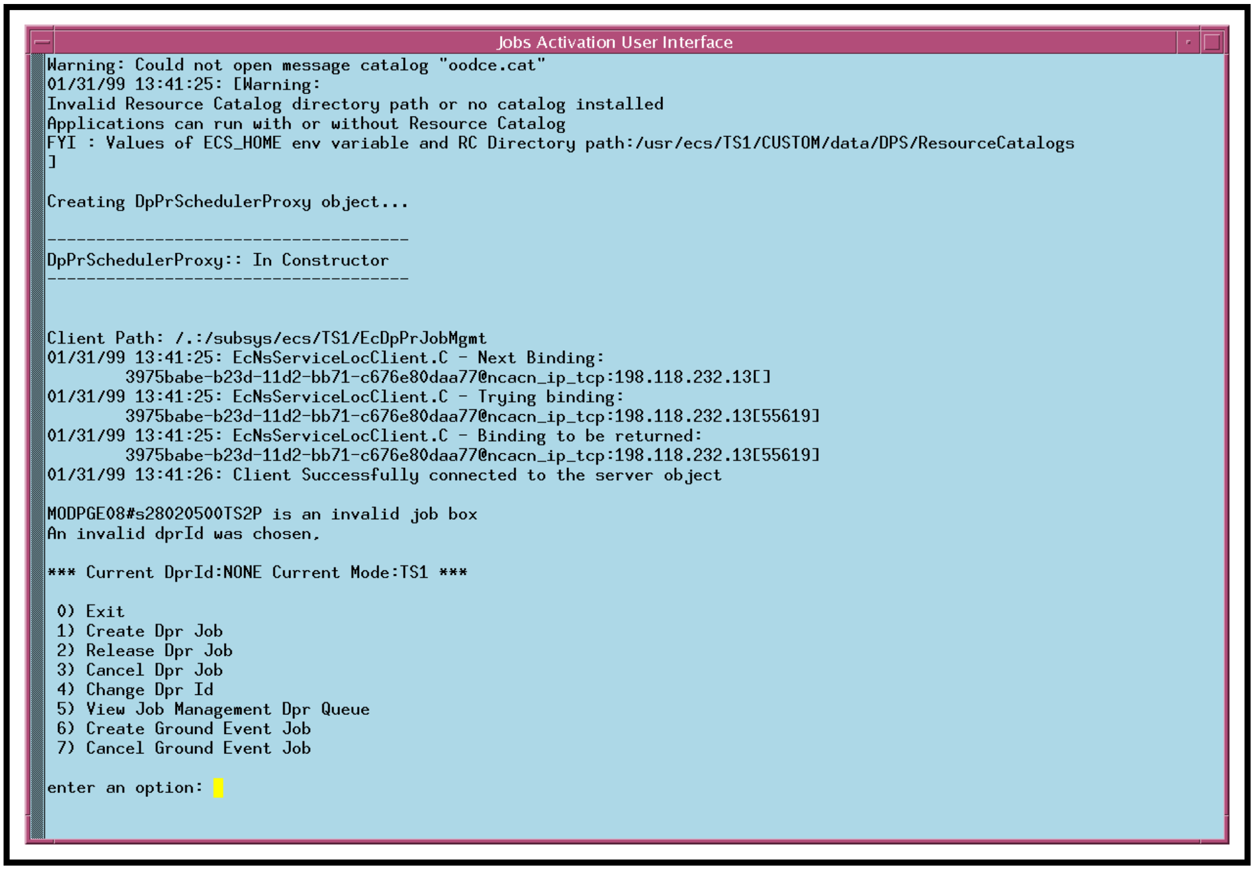

Figure 55. Job Activation User Interface Window

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Reviewing Activity and Job Dependency Logs

Reviewing an Activity Log

The Production Monitor reviews the activity log to obtain the following types of information:

- which jobs have been completed.
- which jobs are currently running.
- which jobs are in the queue.

The Production Monitor reviews the activity log using the AutoSys **autorep** command. The **autorep** command reports information about a job, jobs within boxes, machines, and machine status. Figure 56 shows a sample activity log.

```
------------------------------------< Date: 06/14  21:52:04   >----------------------------
EVENT: CHANGE_STATUS        STATUS:  STARTING   JOB: stage.DPR_04
EVENT: CHANGE_STATUS        STATUS:  RUNNING    JOB: stage.DPR_04
EVENT: CHANGE_STATUS        STATUS:  SUCCESS    JOB: stage.DPR_04

------------------------------------< Date: 06/14  21:53:04   >----------------------------
EVENT: CHANGE_STATUS        STATUS:  STARTING   JOB: prepare.DPR_08
EVENT: CHANGE_STATUS        STATUS:  RUNNING    JOB: prepare.DPR_08
EVENT: CHANGE_STATUS        STATUS:  SUCCESS    JOB: prepare.DPR_08
```

Figure 56. Sample Activity Log

The procedure starts with the assumption that the Production Monitor has logged in to the system.

NOTE: Commands in Steps 1 through 9 are typed at a UNIX system prompt.

1• At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4• Start the log-in to the Queuing Server host by typing **/tools/bin/ssh *hostname*** (e.g., **e0sps04**, **g0sps06**, **l0sps03**, or **n0sps08**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5• If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6• At the **<*user@remotehost*>’s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **cd /*path*** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/COTS/autotreeb/autouser, /usr/ecs/*MODE*/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the set-up files (e.g., FMR.autosys.csh.g0sps06).

- The particular path to be typed may vary from site to site.

8 Type **source *AUTOSYSINSTANCE*.autosys.csh.*hostname*** then press **Return/Enter**.

- The **source** command sets the environment variables.

9• Type **autorep -J ALL** unless the command needs to be modified in one of the following ways:

- To specify a particular job, type the job name instead of **ALL.**
- To obtain a machine report, type **-M *machine_name*** after either **ALL** or the job name.
- To obtain a summary report, type **-s** after either **ALL** or the job name.
- To obtain a detailed report, type **-d** after either **ALL** or the job name.
- To obtain a query report, type **-q** after either **ALL** or the job name.
- To display the document one page at a time, type either **| pg** or **| more** after typing the code for whichever of the preceding options are desired.
- To print the document, type **| lp** after typing the code for whichever of the preceding options are desired.
- To save the report in a file, type **> /*path*/*filename*** after either **ALL** or the job name.

10 Press the **Return/Enter** key on the keyboard to obtain access to the **Activity Log**.

- The **Activity Log** (Figure 56) is displayed.
- If **| lp** was typed on the command line, the **Activity Log** is printed.
- If **> /*path*/*filename*** was typed on the command line, the **Activity Log** is has been saved under the specified ***filename***.

11 Review the **Activity Log** to determine job states.

- Completed.
- Currently running.
- In the queue.

Reviewing a Job Dependency Log

The Production Monitor reviews a job dependency log using the AutoSys **job_depends** command. The **job_depends** command reports information about the dependencies and conditions of jobs. The command can be used for determining the current state of a job, its job dependencies, the dependencies and nested hierarchies (for boxes) as specified in the job definition, and a forecast of what jobs will run during a given period of time.

The procedure starts with the assumption that the Production Monitor has logged in to the system.

Reviewing a Job Dependency Log

1• Set up **AutoSys** as described in Steps 1 through 8 of the procedure for **Reviewing an Activity Log**.

2• Type **job_depends -c -J ALL** unless the command needs to be modified in one of the following ways:

- To specify a particular job, type the job name instead of **ALL**.
- To obtain the current condition status, type **-c** before **-J**.
- To obtain the dependencies only, type **-d** before **-J**.
- To obtain the time dependencies, type **-t** before **-J**.
- To display the document one page at a time, type either **| pg** or **| more** after typing the code for whichever of the preceding options are desired.
- To print the document, type **| lp** after typing the code for whichever of the preceding options are desired.
- To save the report in a file, type **>** ***/path/filename*** after either **ALL** or the job name.

3 Press the **Return/Enter** key on the keyboard to obtain access to the Activity Log.

- The **Job Dependency Log** (Figure 57) is displayed.
- If **| lp** was typed on the command line, the **Job Dependency Log** is printed.
- If **>** ***/path/filename*** was typed on the command line, the **Activity Log** is has been saved under the specified ***filename***.

4• Review the **Job Dependency Log** to determine job status, including the status of atomic conditions.

Job Name	Status	Date Cond?	Start Cond?	Dependent Jobs?
DPR##	Activated	No	Yes	No

Condition: (success(DPR_##) and exit code(execute.DPR_##)<5)

Atomic Condition	Current Status	T/F
SUCCESS(SPR_##)	SUCCESS	T
EXIT_CODE(execute.DPR_##)	SUCCESS	F

Figure 57. Sample Job Dependency Log

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Defining and Running Monitors/Browsers

Defining Monitors/Browsers

The current edition of the *Release 5A Operations Tools Manual for the ECS Project* (609-CD-500-001) indicates that ECS does not support the AutoSys monitor/browser capabilities. However, they are functional and the Production Monitor can use them (with no expectation of ECS support if problems are encountered).

Although some Production Monitors may wish to monitor all events, it is more likely that they will prefer to limit monitoring to alarms and changes of job status (e.g., from “running” to “success” or “failure”). They use the browser function (Figure 58) to determine such things as the current status of a particular job or which jobs presently have a particular status (e.g., which jobs, if any, are on hold).

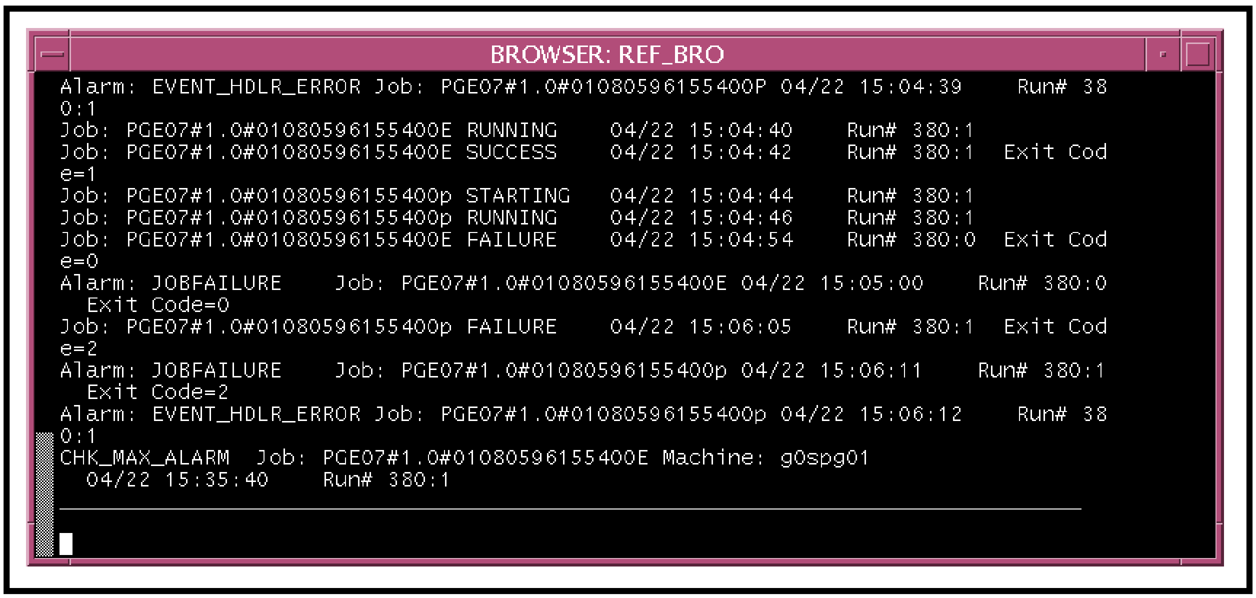

Figure 58. Sample Browser Screen

The procedure for defining monitors or browsers starts with the assumption that all applicable servers are currently running, AutoSys has been launched, and the **AutoSys GUI Control Panel** (Figure 39) is being displayed.

1 Click on the **Monitor/Browser** button on the **AutoSys GUI Control Panel**.

- The **Monitor/Browser** GUI (Figure 59) is displayed.

2 Type a name for the monitor or browser in the **Name** field near the top of the GUI.

- Name must be in valid file-name format.
- If a pre-defined monitor or browser is desired, use the **Search** button under the **Name** field to call it up.

3 Click on either the **Alarms** button or the **ALL EVENTS** button for **Types of Events.**

4 Click on either **ALL Job Status Events** or the corresponding toggle button(s) to select individual **Job Status Events.**

- Any or all of the following **Job Status Events** can be selected:
  - **Running**.
  - **Success.**
  - **Failure.**
  - **Terminated.**
  - **Starting.**
  - **ReStarting.**
  - **On Ice**.
  - **On Hold.**

5 Click on the corresponding toggle button to select the desired **Job Selection Criteria.**

- Job selection criteria options are as follows:
  - **All Jobs.**
  - **Box with its Jobs.**
  - **Single Job.**

6 If **Single Job** was selected in the previous step, type the job name in the **Job Name** field.

7 Click on the corresponding toggle button to select the desired **Monitor Options.**

- **Monitor Options** refers to one of the following choices:
  - **Sound.**
  - **Verification Required for Alarms.**

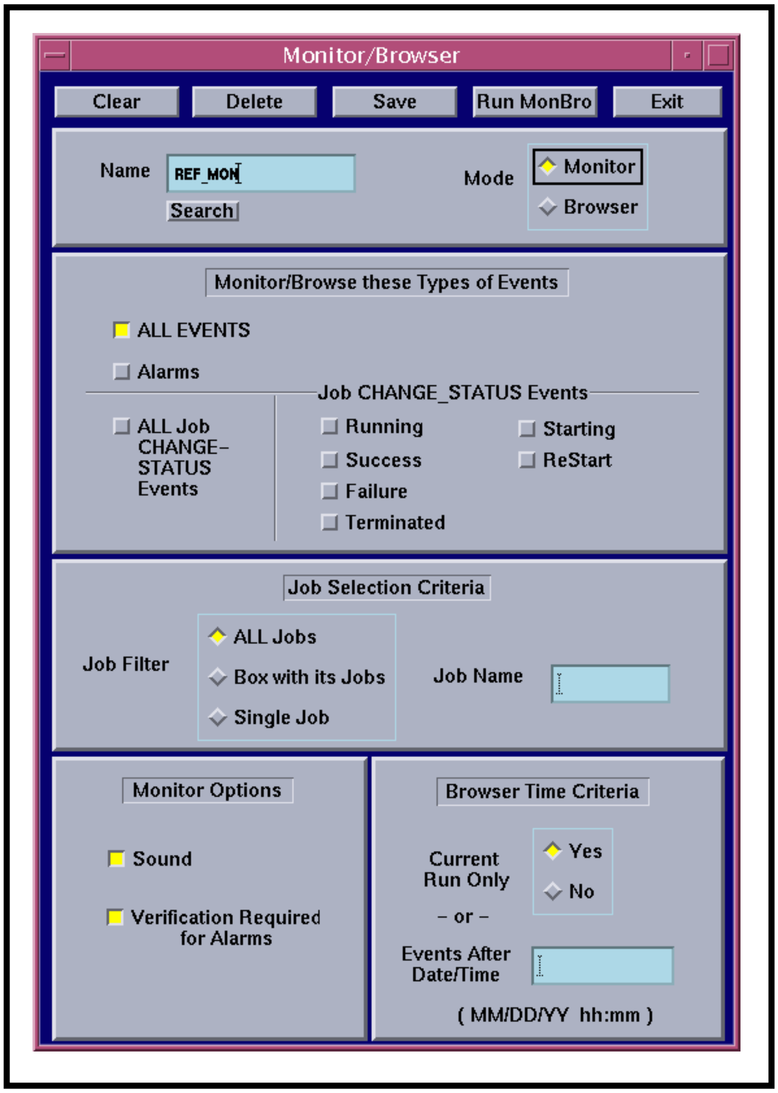

Figure 59. Monitor/Browser GUI

8 Click on **Yes** or **No** to select the desired **Current Run Time** and/or **Events After Date/ Time**, which are the **Browser Time Criteria.**

9 If **Events After Date/Time** was selected in the previous step, type the starting date and time (in *MM/DD/YY hh:mm* formats) in the **Events After Date/Time** field.

10 Click on the corresponding toggle button to select the desired **Mode**.

- The following options are available:
  - — **Monitor.**
  - — **Browser.**

- If **Monitor** is selected, settings are defined for a monitor.
- If **Browser** is selected, settings are defined for a report.

11 Click on the **Save** button.

- The monitor or browser definition is saved to the database.
- Before running a monitor or browser you must **Save** the monitor/browser definition first.

12 Click on the **Run MonBro** button to run the monitor/browser that has just been defined.

13 Review the monitor/browser results.

14 Type Ctrl-C to exit from a browser or monitor.

Running Monitors/Browsers

There are two procedures for running monitors/browsers. Monitors/browsers may be run from the **Monitor/Browser** GUI or they may be run using UNIX commands. In either case, the procedure starts with the assumption that the Production Monitor has logged in to the system.

Running Monitors/Browsers from the Monitor/Browser GUI

---

1 Click on the **Monitor/Browser** button on the **AutoSys GUI Control Panel**.

- The **Monitor/Browser** GUI (Figure 59) is displayed.

2 If the name of the monitor or browser is known exactly, type the name in the **Name** field.

- Go to Step 6.

3 If the name of the monitor or browser is **not** known exactly, type **%** (percent sign wild card) in the **Name** field.

4 Click on the **Search** button.

5 Double-click on the name of the monitor/browser in the list displayed in the dialog box to retrieve the desired monitor/browser definition.

6 Click on the **Run MonBro** button.

- Monitor/browser is displayed in a separate window.

7 Click on the **Exit** button to exit from the **Monitor/Browser** GUI.

8 Type **Ctrl-C** in the browser/monitor window to exit from the browser or monitor.

Running Monitors/Browsers Using UNIX Commands

1 Set up **AutoSys** as described in Steps 1 through 8 of the procedure for **Reviewing an Activity Log**.

2 Type **monbro -N** ***name*** **&** then press the **Return/Enter** key on the keyboard to run the previously defined monitor/browser.

- The monitor or report (browser) must have been previously defined and saved under an appropriate file ***name*** using the **Monitor/Browser** GUI.
- The report is displayed.
- Refer to the *AutoSys User Manual* for all options and displays for all **monbro** reports.

3 Review the monitor/browser results.

4 Type **Ctrl-C** to exit from the browser or monitor.

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Changing the Database Maintenance Time

Database Maintenance Time

Once a day the Event Processor (also known as the AutoSys daemon) goes into an internal database maintenance cycle. During this time, it does not process any events and it waits for the maintenance activities to be completed before resuming normal operations. The time of day for start-up of the maintenance cycle is pre-set to 3:30 AM. The database maintenance cycle takes approximately one minute. If it is necessary to change the time when the maintenance cycle occurs, the Production Monitor can reset it, preferably to a time when there is minimal activity.

The procedure for changing the database maintenance time starts with the assumption that the Production Monitor has logged in to the system.

Changing the Database Maintenance Time

NOTE: Commands in Steps 1 through 8 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY** ***clientname*****:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Queuing Server host by typing **/tools/bin/ssh** ***hostname*** (e.g., **e0sps04**, **g0sps06**, **l0sps03**, or **n0sps08**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.

- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **cd /*path*** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/COTS/autotreeb/autouser, /usr/ecs/*MODE*/COTS/autotree/autouser, /data1/SHARED/COTS/autotree/autouser) containing the **config.*AUTOSYSINSTANCE*** file.
- The particular path to be typed may vary from site to site.

8 Type **vi config.*AUTOSYSINSTANCE*** then press **Return/Enter**.

- The configuration file is displayed by the vi text editor.

9 Using vi editor commands find **DBMaintTime=** and replace the existing time with the desired time in 24 hour format (hh:mm).

- The time may already have been changed to some value other than 03:30 (e.g., **DBMaintTime=04:00**).
- The following vi editor commands are useful:
  - **h** (move cursor left)
  - **j** (move cursor down)
  - **k** (move cursor up)
  - **l** (move cursor right)
  - **i** (insert text)
  - **x** (delete a character)
  - **u** (undo previous change)
  - **Esc** (switch to command mode)

10 Press the **Esc** key.

11 Type ZZ.

- New database maintenance time is entered and saved in the configuration file.
- UNIX prompt is displayed.

System Tuning

Monitoring the Load on Processing Resources

The Production Planner and Production Monitor should work with the Resource Planner to make optimum use of processing resources. The Resource Planner allocates the disk partitions, CPUs, and RAM available for processing among the active modes (e.g., OPS, TS1, TS2). The Production Planner and Production Monitor monitor the load on the processing resources.

The Resource Planner assigns the bulk (typically 60% - 80%) of the processing resources to the OPS mode. The remainder of the processing assets are divided among the modes used for SSI&T and new version software checkout.

The Production Planner and Production Monitor monitor the load on the processing resources to identify whether the actual load is appropriately distributed among modes. They either inform the Resource Planner of under- or over-use of resources as allocated or have the DpPrAutoSysMaxJobs parameter in the EcDpPrJobMgmt.CFG file adjusted.

When monitoring the load on the processing resources, the Production Planner and Production Monitor should take the following considerations into account:

- Disk space allocated to OPS mode is likely to be used to capacity.
- Disk space assigned to the other two modes may not fill up.
- There is no one-to-one mapping of CPU allocation with actual CPUs on the science processor.
- The operating system (OS) takes care of true CPU and RAM allocation.
  - Actual CPU usage during processing is limited by the OS.
  - If ten CPUs have been specified for a particular mode, only ten Data Processing Requests (DPRs) can be running the Execute job at a given time.
  - What is really being defined is the maximum number of DPRs that will execute at a given time.
- CPUs can be over-allocated or under-allocated as necessary to get the most out of the CPUs on each science processor.
- If monitoring indicates that the processor is underused when OPS mode is at full processing capacity, the number of CPUs allocated to OPS mode could probably be increased.
- If the science processor is at full capacity when OPS mode is at full processing capacity (and the processor may be overworked) the number of CPUs allocated to OPS mode should be reduced.

- Random-access memory (RAM) is subject to the same considerations as CPUs.
  - RAM can be over-allocated or under-allocated as necessary to get the most out of the memory on each science processor.

Throttling the Processing Load by Modifying the Maximum Number of Jobs in AutoSys

Another consideration is the throttling of the processing load through the DpPrAutoSysMaxJobs parameter. DpPrAutoSysMaxJobs is defined in the EcDpPrJobMgmt.CFG file in the /usr/ecs/MODE/CUSTOM/cfg directory on the Queuing Server (e.g., g0sps06).

- If DpPrAutoSysMaxJobs in OPS mode were set at 64 [allowing AutoSys to accommodate eight DPRs (consisting of eight jobs each) simultaneously in OPS mode] and ten CPUs were defined for OPS, it would not be possible to utilize all ten CPUs.
- If the value of DpPrAutosysMaxJobs were increased to 120 (15 DPRs times 8 jobs/DPR), there might be times when the processing of some DPRs would be held up because only ten could be running the Execute job at a time.
  - In such a case it might be possible to increase the number of CPUs allocated to the mode so that more than ten DPRs could be running the Execute job simultaneously.

The procedure for modifying the maximum number of jobs in AutoSys starts with the assumption that the Production Monitor has logged in to the system.

Modifying the Maximum Number of Jobs in AutoSys

NOTE: Commands in Steps 1 through 8 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Queuing Server host by typing **/tools/bin/ssh *hostname*** (e.g., **e0sps04**, **g0sps06**, **l0sps03**, or **n0sps08**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** (“**y**” alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>’s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **cd /*path*** then press **Return/Enter**.

- Change directory to the directory (e.g., /usr/ecs/*MODE*/CUSTOM/cfg) containing the **EcDpPrJobMgmt.CFG** file.
- The particular path to be typed may vary from site to site.

8 Type **vi EcDpPrJobMgmt.CFG** then press **Return/Enter**.

- The configuration file is displayed by the vi text editor.

9 Using vi editor commands find **DpPrAutoSysMaxJobs=** and replace the existing number with the desired number.

- The following vi editor commands are useful:
  - **h** (move cursor left)
  - **j** (move cursor down)
  - **k** (move cursor up)
  - **l** (move cursor right)
  - **i** (insert text)
  - **x** (delete a character)
  - **u** (undo previous change)
  - **Esc** (switch to command mode)

10 Press the **Esc** key.

11 Type ZZ.

- New value for **DpPrAutoSysMaxJobs** is entered and saved in the configuration file.
- UNIX prompt is displayed.

12 Repeat Steps 7 through 11 as necessary to modify the values assigned to the **DpPrAutoSysMaxJobs** parameter in other modes.

Troubleshooting Processing Problems

Trouble Symptoms

Troubleshooting is a process of identifying the source of problems on the basis of observed trouble symptoms. One common source of problems involves connections with other subsystems for the transmission of messages or data. Like many other operational areas in ECS, processing has interfaces with many other subsystems. Consequently, problems with processing can be traced to either the Data Processing Subsystem or one of many other ECS subsystems, including (but not necessarily limited to) those in the following list:

- Planning Subsystem (PLS).
- Data Server Subsystem (DSS).
- Interoperability Subsystem (IOS).
- Communications Subsystem (CSS).

Table 10 describes actions to be taken in response to some common Processing problems. If the problem cannot be identified and fixed without help within a reasonable period of time, the appropriate response is to call the help desk and submit a trouble ticket in accordance with site Problem Management policy.

Table 10. Troubleshooting Processing Problems

Symptom	Response
Unable to log in to the Queuing Server host (e.g., g0sps06).	Check with the Operations Controller/System Administrator to ensure that the host is “up."
GUI not displayed when the start-up script has been properly invoked.	1. Ensure that the DISPLAY variable was set properly. 2. Ensure that the xhost command was given on the initial login host. [For detailed instructions refer to the procedure for **Launching Production Processing Applications** (previous section of this lesson).]
AutoSys job hangs (does not complete within the predicted time period).	Refer to the procedure for **Handling a Job that is Hanging in AutoSys** (subsequent section of this lesson).
“Allocate” job fails.	Refer to the procedure for **Handling an Allocation Job Problem** (subsequent section of this lesson).
“Stage” job fails.	Refer to the procedure for **Handling a Staging Job Problem** (subsequent section of this lesson).
“Preprocess” job fails.	Refer to the procedure for **Handling a Preprocessing Job Problem** (subsequent section of this lesson).

Table 10. Troubleshooting Processing Problems

Symptom	Response
“Execute” job fails.	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” refer the problem to SSI&T personnel.
“Post-process” job fails.	Refer to the procedure for **Handling a Postprocessing Job Problem** (subsequent section of this lesson).
“Insert” job fails.	Refer to the procedure for **Handling an Insertion Job Problem** (subsequent section of this lesson).
“Deallocate” job fails.	1. Ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are “up.” 2. If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView. 3. If hosts/servers are all “up,” check the log files (e.g., *DPR#*.ALOG) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]
Other problems.	Check the log files (e.g., EcDpPrJobMgmt.ALOG, EcDpPrDeletion.ALOG, *DPR#*.ALOG, *DPR#*.err) in the /usr/ecs/*MODE*/CUSTOM/logs directory for error messages. [For detailed instructions refer to the procedure for **Checking Log Files** (subsequent section of this lesson).]

Table 11. Hosts, Servers, Clients and Other Software Relevant to ECS Data Processing Phases

HOST **SERVER/CLIENT/OTHER SOFTWARE** **NOTE:** Servers that are displayed on ECS Assistant are shown in **boldface** type in the table. **NOTE:** Depending on the installation, software may be loaded on hosts other than the examples provided.	**PROCESSING PHASE** **ALLOCATE**	**STAGE**	**PREPROCESS**	**EXECUTE**	**POSTPROCESS**	**INSERT**	**DEALLOCATE**
Science Processor (e.g., x0spg01)	X	X	X	X	X	X	X
PGE Management (EcDpPrRunPGE)				X			
Resource Usage (EcDpPrRusage)				X			
PGE				X			
Queuing Server (e.g., x0sps04)	X	X	X	X	X	X	X
Job Management Server (EcDpPrJobMgmt)	X	X	X	X	X	X	X
Deletion Server (EcDpPrDeletion)	X	X	X	X	X	X	X
Data Management (EcDpPrDM)		X				X	
Execution Management (EcDpPrEM)	X		X		X		X
Subscription Manager (EcDpPlSubMgr)							
Distribution Server (e.g., x0dis02)	X	X				X	
Distribution Server (EcDsDistributionServer)	X	X				X	
SDSRV Server (e.g., x0acs05)	X	X				X	
Science Data Server (EcDsScienceDataServer)	X	X				X	
APC Server (e.g., x0acg01)	X	X				X	
Archive Server (EcDsStArchiveServer)	X	X				X	
FTP Distribution Server (EcDsStFtpDisServer)	X	X				X	
Staging Monitor Server (EcDsStStagingMonitorServer)	X	X				X	
Staging Disk Server (EcDsStStagingDiskServer)	X	X				X	
Pull Monitor Server (EcDsStPullMonitorServer)							

Table 11. Hosts, Servers, Clients and Other Software Relevant to ECS Data Processing Phases

HOST	PROCESSING PHASE						
SERVER/CLIENT/OTHER SOFTWARE **NOTE:** Servers that are displayed on ECS Assistant are shown in **boldface** type in the table. **NOTE:** Depending on the installation, software may be loaded on hosts other than the examples provided.	**ALLOCATE**	**STAGE**	**PREPROCESS**	**EXECUTE**	**POSTPROCESS**	**INSERT**	**DEALLOCATE**
Interface Server 01 (e.g., x0ins02)	X	X				X	
Advertising Server (EcIoAdServer)	X	X	X			X	
Interface Server 02 (e.g., x0ins01)	X	X				X	
Subscription Server (EcSbSubServer)	X	X				X	
Event Server (EcSbEventServer)							
Data Dictionary (EcDmDictServer)							

Handling a Job that is Hanging in AutoSys

If an AutoSys job is hanging, the job symbol in AutoSys JobScape, TimeScape, or HostScape GUI will have turned green to indicate that the job is running but it would not have turned either red ("failed") or light blue ("success") within the predicted period of time. The following conditions can cause an AutoSys job to hang:

- The Science Data Server (SDSRV) may be waiting for a request to Data Distribution (DDIST) to distribute files (e.g., the PGE tar file in the allocation job or input data in staging) but cannot because Storage Management (STMGT) is down.
- The Science Data Server (SDSRV) may be waiting for a request to Data Distribution (DDIST) to distribute files (e.g., the PGE tar file in the allocation phase or input data in staging); however, Storage Management (STMGT) cannot ftp the file to the data directory on the science processor disk, so DDIST cannot distribute the files.
- The SDSRV may be "down."

The procedure for Handling a Job that is Hanging in AutoSys starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host(e.g., g0sps06).

Handling a Job that is Hanging in AutoSys

1 Access a terminal window logged in to the Queuing Server host (e.g., e0sps04, g0sps06, l0sps03, n0sps08).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the DPR .err files (e.g., ACT#syn1#004130123TS1.err).

3 Type **/usr/xpg4/bin/tail -f -n 20 *filename*** then press **Return/Enter**.

- ***filename*** refers to the DPR .err file to be reviewed (e.g., ACT#syn1#004130123TS1.err).
- The last 20 lines of the .err file are displayed and additional data (if any) is displayed as it is written to the file.

4 Review the .err file to identify problems that are occurring or have occurred.

- Most likely either nothing is being written to the file or the job is in a retry loop.

5 If the job is in a retry loop, verify (e.g., using ECS Assistant) that the hosts/server processes necessary for the affected job are "up."

- The SDSRV may be down.
- The first retry is designed to fail, because the software is retrieving server-side information to refresh the client side at this point.
- Refer to Table 11 to determine which hosts/servers are critical to the job.

6 If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView.

- Go to the procedure for **Force-Starting a Job** (subsequent section of this lesson) after the problem has been corrected.

7 If nothing is being written to the .err file, ask the Ingest/Distribution Technician to check whether the distribution request has been suspended with errors.

- If the distribution request has been suspended with errors, the Ingest/Distribution Technician should take the following actions:
  - Requests the Operations Controller/System Administrator to bounce the STMGT servers.
  - "Resumes" the distribution request.
  - Verifies that the distribution request resumes processing.

8 If the distribution request resumes processing after the Ingest/Distribution Technician has taken action, go to the procedure for **Force-Starting a Job** (subsequent section of this lesson).

9 If the distribution request does **not** resume processing, log in to the Science Processor host (e.g., e0spg01, g0spg01, l0spg01, n0spg03) as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

10 Type **cd /usr/ecs/*MODE*/CUSTOM/pdps/*processor*/data/DpPrRm/*processor*_disk** then press **Return/Enter**.

- ***processor*** refers to the Science Processor host (e.g., e0spg01, g0spg01, l0spg01, n0spg03).
- The ***processor*_disk** directory (e.g., g0spg01_disk) is the target directory where the data server puts the inputs needed for processing.

11 If the target directory does **not** exist, notify the Operations Controller/System Administrator to have it restored.

- Go to the procedure for **Force-Starting a Job** (subsequent section of this lesson) after the problem has been corrected.

12 If the target directory does exist, try to ftp a file to the directory on the science processor.

13 Notify the Operations Controller/System Administrator of the results of the attempt to ftp a file to the target directory.

- Go to the procedure for **Force-Starting a Job** (subsequent section of this lesson) after the problem has been corrected.

Force-Starting a Job

The procedure for Force-Starting a Job starts with the assumption that AutoSys has been launched and either JobScape (Figure 42) or TimeScape (Figure 41) is being displayed.

Force-Starting a Job

1 Click and hold on the applicable job symbol in the AutoSys JobScape or TimeScape GUI with the **right** mouse button.

- **Descendants** pop-up menu appears.

2 Select (highlight) **Force Start Job** from the **Descendants** pop-up menu (release the right mouse button).

- The job symbol in AutoSys JobScape or TimeScape GUI should turn green ("starting") within a short period of time.

3 If the job symbol in AutoSys JobScape or TimeScape GUI does **not** turn green ("starting") within a short period of time, return to Step 1.

Handling an Allocation Job Problem

If the allocation job fails, the ALOG file on the Data Processing host can be checked to see whether the PGEEXE.tar file was successfully acquired. If there is an acquire failure, the appropriate action is to perform the procedure for **Handling an Acquire Failure** (subsequent section of this lesson).

The procedure for checking the Allocation Job ALOG file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking the Allocation Job ALOG File

---

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., ACT#syn1#004130123TS1.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., ACT#syn1#004130123TS1.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the PGEEXE.tar file was successfully acquired.

5 If the PGEEXE.tar file was successfully acquired, go to the procedure for **Force-Starting a Job** (previous section of this lesson).

6 If there is an acquire failure, perform the procedure for **Handling an Acquire Failure** (subsequent section of this lesson).

Handling an Acquire Failure

Diagnosing an acquire failure involves examining the following system log files and directories involved in the process:

- Science Data Server ALOG File (EcDsScienceDataServer.ALOG file).
- Archive Server ALOG File (EcDsStArchiveServer.ALOG).
- Staging Area.
  - Presence of the relevant file.
  - Staging Disk ALOG File (EcDsStStagingDiskServer.ALOG or EcDsStStagingMonitorServer.ALOG).
  - Space available in the staging area.

Checking the Science Data Server ALOG File

The procedure for checking the EcDsScienceDataServer.ALOG file starts with the assumption that the operator has logged in to the ECS system.

Checking the Science Data Server ALOG File

---

1 Log in to the SDSRV Server host (e.g., e0acs05, g0acs03, l0acs03, n0acs04) as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/mode/CUSTOM/logs** then press **Return/Enter**.

3 Type **view EcDsScienceDataServer.ALOG** then press **Return/Enter**.

- Although this procedure has been written for the **view** command, any UNIX editor or visualizing command (e.g., **vi**, **pg**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the relevant file was successfully acquired.

- The EcDsScienceDataServer.ALOG file should contain entries identifying the file to be acquired by the ShortName of the corresponding ESDT.
- The EcDsScienceDataServer.ALOG file should contain entries regarding the acquire activity. The following types of messages should be included in the ALOG file:

  Msg: File 1 to be distributed: :SC:MOD03.001:1369:1.HDF-EOS

  Priority: 0 Time : 07/29/98 12:35:42

  PID : 24279:MsgLink :1684108385 meaningfulname :DsSrWorkingCollectionDistributeOneDistributFile

  Msg: File 2 to be distributed: SCMOD03.0011369.met

- If the ShortName does not appear in the ALOG file, with a timestamp corresponding to the time of the attempted acquire, SDSRV may not be running, or may not be communicating with other servers.
- If the ALOG file does contain entries for that ShortName, and indicates that two files (the file and its associated metadata file) are being distributed, SDSRV has completed its role in the acquire.
- If the ALOG contains the ShortName, and also contains an error showing that the data file time stamp does not match the time stamp required by the acquire, the data file needs to be removed from the Science Data Server and reinserted.
  - This is usually done using a script called DsDbCleanGranules.

5 Type **:q!** then press **Return/Enter** to quit the view application.

6 If the ShortName does **not** appear in the ALOG file, with a timestamp corresponding to the time of the attempted acquire, ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are "up."

- If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView.
- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

7 If the ALOG contains the ShortName, and also contains an error showing that the data file time stamp does not match the time stamp required by the acquire, notify the Archive Manager to have the data file removed from the Science Data Server and reinserted.

- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

8 If the ALOG file does contain entries for the ShortName and indicates that two files (the file and its associated metadata file) are being distributed, continue with the procedure for **Checking the Archive Server ALOG File**.

Checking the Archive Server ALOG File

Acquire success from the Science Data Server is only part of the acquire process. Since any file entered into SDSRV is stored in the archive, the Archive Server must be involved during an acquire. Consequently, it may be useful to inspect the Archive Server ALOG file (EcDsStArchiveServer.ALOG) to check for error messages associated with the ShortName of the file type.

The procedure for checking the archive server ALOG file starts with the assumption that the operator has logged in to the ECS system.

Checking the Archive Server ALOG File

1 Log in to the Distribution Server (e.g., e0dis02, g0dis02, l0dis02, n0dis02) host as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

3 Type **view EcDsStArchiveServer.ALOG** then press **Return/Enter**.

- Although this procedure has been written for the **view** command, any UNIX editor or visualizing command (e.g., **vi**, **pg**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the relevant file was successfully acquired.

5 Type **:q!** then press **Return/Enter** to quit the view application.

6 If the relevant file was **not** successfully acquired, notify the Archive Manager to have the data file reacquired for Data Processing.

- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

7 If the relevant file was successfully acquired, continue with the procedure for **Checking the Staging Disk**.

Checking the Staging Disk

During an acquire, files are copied to a staging area as an intermediate step before distributing them to their destination. As part of diagnosing an acquire failure it is useful to check the staging area to ascertain whether the files have completed part of their journey. Both the file and a subdirectory containing metadata information should be written to the staging area.

The procedure for checking the staging disk starts with the assumption that the operator has logged in to the ECS system.

Checking the Staging Disk

1 Log in to the Distribution Server (e.g., e0dis02, g0dis02, l0dis02, n0dis02) host as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/drp/*archivehost*/data/staging/user#** then press **Return/Enter**.

3 Type **ls -lrt** then press **Return/Enter**.

4 Review the directory to determine whether the relevant file was successfully staged.

5 If the relevant file was successfully staged, ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are "up."

- If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView.
- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

6 If the relevant file was **not** successfully staged, continue with the procedure for **Checking the Staging Disk ALOG File** to try to determine why it was not successfully staged.

Checking the Staging Disk ALOG File

If the failure occurs in copying the files to the staging area, then the Staging log files (EcDsStStagingDiskServer.ALOG or EcDsStStagingMonitorServer.ALOG) may reveal the cause.

The procedure for checking the staging disk ALOG file starts with the assumption that the operator has logged in to the ECS system.

Checking the Staging Disk ALOG File

---

1 Log in to the Distribution Server (e.g., e0dis02, g0dis02, l0dis02, n0dis02) host as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

3 Type **view EcDsStStagingDiskServer.ALOG** or **EcDsStStagingMonitorServer.ALOG** then press **Return/Enter**.

- Although this procedure has been written for the **view** command, any UNIX editor or visualizing command (e.g., **vi**, **pg**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the relevant file was successfully staged.

5 Type **:q!** then press **Return/Enter** to quit the view application.

6 If the relevant file was successfully staged, ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are "up."

- If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView.
- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

7 If the relevant file was **not** successfully staged, continue with the procedure for **Checking the Space Available in the Staging Area**.

Checking the Space Available in the Staging Area

Failure can be caused by a lack of space in the staging area.

The procedure for checking the space available in the staging area starts with the assumption that the operator has logged in to the ECS system.

Checking the Space Available in the Staging Area

1 Log in to the Distribution Server (e.g., e0dis02, g0dis02, l0dis02, n0dis02) host as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/drp/*archivehost*/data/staging/user#** then press **Return/Enter**.

3 Type **df -k .** then press **Return/Enter**.

4 Review the available space listed to determine whether there is adequate space for staging the relevant file.

5 If there is **not** adequate space for staging the relevant file, notify the Operations Controller/System Administrator of the lack of space.

6 If there is adequate space for staging the relevant file, notify the Archive Manager to have the data file reacquired for Data Processing.

7 Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

Handling a Staging Job Problem

The staging step in processing involves acquiring files from the archive. The ALOG file on the Data Processing host can be checked to see whether the files were successfully acquired. If there is an acquire failure, the appropriate action is to perform the procedure for **Handling an Acquire Failure** (previous section of this lesson).

The procedure for checking the Staging Job ALOG file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking Staging Job ALOG File

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., ACT#syn1#004130123TS1.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., ACT#syn1#004130123TS1.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the input data files were successfully acquired.

5 If the input data files were successfully acquired, go to the procedure for **Force-Starting a Job** (previous section of this lesson).

6 If there is an acquire failure, perform the procedure for **Handling an Acquire Failure** (previous section of this lesson).

Handling an Preprocessing Job Problem

Preprocessing rarely fails completely. However, it may not generate the system Process Control File (PCF) correctly. The general process for handling a preprocessing job problem is as follows:

- Check the ALOG file to determine whether there is a problem with the PCF.
- If the ALOG file indicates that there is a problem with the PCF, put the execution job on hold.
- Check the system PCF to determine whether it matches expectations.

The procedure for checking the Preprocessing Job ALOG file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking the Preprocessing Job ALOG File

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., ACT#syn1#004130123TS1.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., ACT#syn1#004130123TS1.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether there is any indication that there is a problem with the PCF.

5 If there is **no** indication that there is a problem with the PCF, go to the procedure for **Force-Starting a Job** (previous section of this lesson).

6 If there is some indication that there is a problem with the PCF, continue with the procedure for **Putting the Execution Job on Hold** and **Checking the Process Control File** (subsequent sections of this lesson).

The procedure for putting the execution job on hold starts with the assumption that the starts with the assumption that AutoSys has been launched and either JobScape (Figure 42) or TimeScape (Figure 41) is being displayed..

Putting the Execution Job on Hold

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1 Click and hold on the applicable job symbol in the AutoSys JobScape or TimeScape GUI with the **right** mouse button.

- **Descendants** pop-up menu appears.

2 Select (highlight) **On Hold** from the **Descendants** pop-up menu (release the right mouse button).

- The job symbol in AutoSys JobScape or TimeScape GUI should turn dark blue (“on hold”) within a short period of time.

The procedure for checking the system PCF starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking the Process Control File

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*mode*/CUSTOM/pdps/*hostname*/data/DpPrRm/*hostname*_disk/*pgeId*/*dprId*_ *hostname*** then press **Return/Enter**.

- Change directory to the directory containing the PCF (e.g., ***pgeId*.Pcf**).

3 Type **pg** ***filename*** then press **Return/Enter**.

- ***filename*** refers to the PCF to be reviewed (e.g., ***pgeId*.Pcf**).
- The first page of the file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the file.

4 Review the PCF to determine whether there are errors in the file.

5 If there are errors in the PCF, refer the problem to SSI&T personnel.

6 If there are **no** errors in the PCF, click and hold on the job symbol for the execution job in the AutoSys JobScape or TimeScape GUI with the **right** mouse button

- **Descendants** pop-up menu appears.

7 Select (highlight) **Off Hold** from the **Descendants** pop-up menu (release the right mouse button).

- The job symbol in AutoSys JobScape or TimeScape GUI should turn white ("activated") within a short period of time.

8 Go to the procedure for **Force-Starting a Job** (previous section of this lesson).

Handling a Post-Processing Job Problem

Post-Processing does not often fail, but it may show as a failure in AutoSys if the Execution stage has failed.

The procedure for checking the Post-Processing Job ALOG file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking the Post-Processing Job ALOG File

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., ACT#syn1#004130123TS1.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., ACT#syn1#004130123TS1.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether there is any indication that the execution job failed.

5 If there is **no** indication that the execution job failed, go to the procedure for **Force-Starting a Job** (previous section of this lesson).

6 If there is an indication that the execution job failed, check the response listed for "'Execute' job fails" in Table 10, Troubleshooting Processing Problems.

Handling an Insertion Job Problem

If the insertion (destaging) job fails, the job symbol in AutoSys JobScape, TimeScape, or HostScape has turned red (failed). The following activities should help isolate the problem:

- Check the .err log file.
- Check the ALOG file.
- Check for an Insert failure.

The procedure for checking the Insertion job .err file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host(e.g., g0sps06).

Checking the Insertion Job .err File

1 Access a terminal window logged in to the Queuing Server host (e.g., e0sps04, g0sps06, l0sps03, n0sps08).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the DPR .err files (e.g., ACT#syn1#004130123TS1.err).

3 Type **/usr/xpg4/bin/tail -f -n 20 *filename*** then press **Return/Enter**.

- ***filename*** refers to the DPR .err file to be reviewed (e.g., ACT#syn1#004130123TS1.err).
- The last 20 lines of the .err file are displayed and additional data (if any) is displayed as it is written to the file.

4 Review the .err file to identify problems that are occurring or have occurred.

5 If the message **Error archiving metadata into catalog** is found and the problem occurred for an existing ESDT which has previously worked within the past day or two, go to the procedures for **Handling an Insert Failure** (subsequent section of this lesson).

- STMGT log files may have indications of problems relating to changes/defects in the stored procedures.

6 If the message **Error archiving metadata into catalog** is found and the ESDT is new or has recently been installed, go to the procedures for **Handling an Insert Failure** (subsequent section of this lesson).

- The values of the mandatory parameters in the .MCF file in the runtime directory may not be consistent with "valids" in the SDSRV database.
- Alternatively, a SDSRV temporary directory may be getting filled up.

7 If the message **Error modifying file usage** is in the file, manually reset to 1 the numberOfUsage column in DpPrFile for the particular file.

- The message indicates that the numberOfUsage column in DpPrFile for a particular file is at 0 and the software is trying to decrement it. This column is an increment/decrement counter and is not normally decremented more times than it is incremented when under software control. However, if someone manually changes the database, the value may no longer be synchronized.
- Go to the procedure for **Force-Starting a Job** (subsequent section of this lesson) after the problem has been corrected.

8 Type **cd /usr/ecs/*MODE*/CUSTOM/pdps/*processor*/data/DpPrRm/*processor*_disk** then press **Return/Enter**.

- ***processor*** refers to the Science Processor host (e.g., e0spg01, g0spg01, l0spg01, n0spg03).
- The ***processor*_disk** directory (e.g., g0spg01_disk) is the target directory where the data server puts the inputs needed for processing.

9 Type **ls** then press **Return/Enter**.

10 Review the directory contents to determine whether there are science data files in the disk partition but no metadata files.

- If there are science data files in the disk partition but no metadata files, DDIST and STMGT are functioning properly but SDSRV is not.
  - Otherwise, STMGT may not be functioning properly.

11 Continue with the procedure for **Checking the Insertion Job ALOG File** (subsequent section of this lesson).

The procedure for checking the Insertion Job ALOG file starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host (e.g., g0sps06).

Checking the Insertion Job ALOG File

---

1 Access a terminal window logged in to the Queuing Server host (e.g., g0sps06).

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., ACT#syn1#004130123TS1.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., ACT#syn1#004130123TS1.ALOG).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **view**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether there is any indication that there is a problem inserting files in Data Server.

5 If there is **no** indication that there is a problem inserting files in Data Server, go to the procedure for **Force-Starting a Job** (previous section of this lesson).

6 If there are indications that there are problems inserting files in Data Server, continue with procedures for **Handling an Insert Failure** (subsequent section of this lesson).

Handling an Insert Failure

If the Science Data Server returns a message indicating that the insertion of output granules into the archive has failed, or if the insertion job fails as indicated in AutoSys, the problem can be diagnosed by verifying the following items:

- Applicable ESDT is in the Science Data Server (SDSRV) database.
- Applicable ESDT is in the advertising database.
- SDSRV ALOG file indicates that the insertion occurred.
- Applicable servers are running.
- DCE Login is valid.

Checking for the Applicable ESDT in the SDSRV Database

No granules can be inserted into the archive unless there is a valid ESDT for the type of granule to be inserted. There must be a valid ESDT in both the SDSRV database and the advertising database. In the SDSRV database the ShortName for the ESDT should be listed in a table called DsMdCollections. If the ShortName is not listed in the table, the ESDT must be inserted in the Science Data Server before the granule insertion can succeed.

The procedure for checking for the applicable ESDT in the SDSRV database starts with the assumption that the operator has logged in to the ECS system.

Checking for the Applicable ESDT in the SDSRV Database

---

1 Log in to the SDSRV Server host (e.g., e0acs05, g0acs03, l0acs03, n0acs04) as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Enter isql commands for checking the SDSRV database DsMdCollections table for the ShortName for the ESDT.

3 If the ShortName for the ESDT is not listed in the SDSRV database DsMdCollections table, notify the Science Data Specialist to have the ESDT added.

- After the ESDT has been added go to the procedure for **Force-Starting a Job** (previous section of this lesson).

4 If the ShortName for the ESDT is listed in the SDSRV database DsMdCollections table, continue with the procedure for **Checking for the Applicable ESDT in the Advertising Database**.

Checking for the Applicable ESDT in the Advertising Database

When an ESDT is installed into the Science Data Server database, the system also makes entries in the advertising (IOS) database. The number and types of entries depends on the contents of the ESDT descriptor file. File insertion failures may also be caused by missing or incomplete IOS database entries for the ESDT. Therefore, it is useful to check IOS to make sure the ESDT corresponding to the file type to be inserted has been properly advertised. This is done by checking the advertising database, IoAdAdvService_*mode*, in a table called IoAdAdvMaster, for the ShortName in question. For each ESDT ShortName the table should show several entries, the number depending on the descriptor file contents. An example of such a listing is given in Table 12.

Table 12. Sample Listing of ESDT Entries in Advertising Database

IoAdAdvMaster
MOD03.001
MOD03.001:ACQUIRE
MOD03.001:INSERT
MOD03.001:UPDATEMETADATA
MOD03.001:BROWSE
MOD03.001:GETQUERYABLEPARAMETERS
MOD03.001:INSPECT
MOD03.001:INSPECTCL
MOD03.001:DELETE
Subscribable Event:ID:##: MOD03.001:DELETE
Subscribable Event:ID:##: MOD03.001:INSERT
Subscribable Event:ID:##: MOD03.001:UPDATEMETADATA

The procedure for checking for the applicable ESDT in the advertising database starts with the assumption that the operator has logged in to the ECS system.

Checking for the Applicable ESDT in the Advertising Database

1 Log in to the Interface Server 01 (e.g., e0ins02, g0ins02, l0ins02, n0ins02) host as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Enter isql commands to check the IoAdAdvService_*mode* database IoAdAdvMaster table for the ESDT's ShortName.

3 If the ShortName for the ESDT is not listed in the IoAdAdvService_*mode* database IoAdAdvMaster table, notify the Science Data Specialist to have the ESDT added.

- After the ESDT has been added go to the procedure for **Force-Starting a Job** (previous section of this lesson).

4 If the ShortName for the ESDT is listed in the IoAdAdvService_*mode* database IoAdAdvMaster table, continue with the procedure for **Checking the Science Data Server ALOG File**.

Checking the Science Data Server ALOG File

During any operation involving the Science Data Server, useful information reflecting SDSRV activities is written to the following two log files:

- EcDsScienceDataServer.ALOG.
- EcDsScienceDataServerDebug.log.

Entries to the ALOG file should include the ShortName of the file data type. Timestamps, which appear throughout the logs files, should be checked to make sure any entries found for a ShortName correspond to the time of the attempted insertion. If the ShortName does not appear, the file insertion request was not communicated to SDSRV. This might be the case if the SDSRV subsystem is not running.

The procedure for checking the EcDsScienceDataServer.ALOG file starts with the assumption that the operator has logged in to the ECS system.

Checking the Science Data Server ALOG File

1 Log in to the SDSRV Server host (e.g., e0acs05, g0acs03, l0acs03, n0acs04) as described in Steps 1 through 6 of the procedure for **Launching Production Processing Applications** (previous section of this lesson).

2 Type **cd /usr/ecs/MODE/CUSTOM/logs** then press **Return/Enter**.

3 Type **view EcDsScienceDataServer.ALOG** then press **Return/Enter**.

- Although this procedure has been written for the **view** command, any UNIX editor or visualizing command (e.g., **vi**, **pg**, **more**, **tail**) can be used to review the log file.

4 Review the log file to determine whether the relevant file was successfully inserted.

- The EcDsScienceDataServer.ALOG file should contain entries identifying the file to be inserted by the ShortName of its ESDT.

- If the ShortName does **not** appear in the ALOG file, with a timestamp corresponding to the time of the attempted insert, SDSRV may not be running, or may not be communicating with other servers.
- If the ShortName does appear in the ALOG file, a message of the following type indicating that the metadata for the granule have been validated should be included in the ALOG file:

  End Metadata Validation. (Metadata is valid).

- If the metadata is **not** valid, the metadata validation section of the ALOG can be scanned to find what metadata errors have been identified by SDSRV.

5 Type **:q!** then press **Return/Enter** to quit the view application.

6 If the ShortName does **not** appear in the ALOG file, with a timestamp corresponding to the time of the attempted acquire, ensure (e.g., using ECS Assistant) that the necessary hosts and servers (listed in Table 11) are "up."

- If hosts/servers have gone down, notify the Operations Controller/System Administrator to have servers brought back up using HP OpenView.
- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problem has been corrected.

7 If the ALOG contains the ShortName and the metadata are valid go to the procedure for **Force-Starting a Job** (previous section of this lesson).

8 If the ALOG contains the ShortName but the metadata are **not** valid, consult with the SSI&T personnel to have the metadata problems corrected.

9 If hosts/servers are up, review the log file to determine whether there are any messages indicating DCE problems.

10 Notify the Operations Controller/System Administrator of suspected DCE problems.

- Go to the procedure for **Force-Starting a Job** (previous section of this lesson) after the problems have been corrected.

Checking Log Files

Log files can provide indications of the following types of problems:

- DCE problems.
- Database problems.
- Lack of disk space.

The procedure for checking log files starts with the assumption that the operator has logged in to the ECS system and the Queuing Server host.

Checking Log Files

1 Access a terminal window logged in to the appropriate host.

2 Type **cd /usr/ecs/*MODE*/CUSTOM/logs** then press **Return/Enter**.

- Change directory to the directory containing the data processing log files (e.g., EcDpPrJobMgmt.ALOG, EcDpPrDeletion.ALOG).

3 Type **pg *filename*** then press **Return/Enter**.

- ***filename*** refers to the data processing log file to be reviewed (e.g., EcDpPrJobMgmt.ALOG, EcDpPrDeletion.ALOG, *DPR#*.ALOG, *DPR#*.err).
- The first page of the log file is displayed.
- Although this procedure has been written for the **pg** command, any UNIX editor or visualizing command (e.g., **vi**, **more**) can be used to review the log file.

4 Review the log file to identify problems that have occurred.

5 Respond to problems as follows:

- DCE problems.
  - Notify the Operations Controller/System Administrator of suspected DCE problems.
- Database problems.
  - Verify that relevant database servers are running.
  - Check for lack of (or corruption of) data in the database using either a database browser or isql commands.
  - Notify the Database Administrator of suspected database problems.
- Lack of disk space.
  - Remove unnecessary files.
  - Notify the Operations Controller/System Administrator of recurring disk space problems.

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Launching the QA Monitor

Launching the QA Monitor

Access to the QA Monitor must be gained through the use of UNIX commands. The process starts with the assumption that the applicable servers are running and the Production Monitor has logged in to the ECS system.

Launching the QA Monitor

NOTE: Commands in Steps 1 through 9 are typed at a UNIX system prompt.

1 At the UNIX command line prompt type **xhost** ***hostname*** then press the **Return/Enter** key on the keyboard.

- ***hostname*** refers to the host on which GUIs are to be launched during the current operating session. Multiple hostnames can be specified on the same line.
- The use of **xhost +** is discouraged because of a potential security problem.

2 Type **setenv DISPLAY *clientname*:0.0** then press the **Return/Enter** key.

- Use either the X terminal/workstation IP address or the machine-name for the ***clientname***.
- When using secure shell, the DISPLAY variable is set just once, before logging in to remote hosts. If it were to be reset after logging in to a remote host, the security features would be compromised.

3 Open another UNIX (terminal) window.

4 Start the log-in to the Planning/Management Workstation by typing **/tools/bin/ssh** ***hostname*** (e.g., **e0pls03**, **g0pls01**, **l0pls02**, or **n0pls02**) in the new window then press the **Return/Enter** key.

- If you receive the message, **Host key not found from the list of known hosts. Are you sure you want to continue connecting (yes/no)?** type **yes** ("**y**" alone will not work).
- If you have previously set up a secure shell passphrase and executed **sshremote**, a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears; continue with Step 5.
- If you have not previously set up a secure shell passphrase; go to Step 6.

5 If a prompt to **Enter passphrase for RSA key '<*user@localhost*>'** appears, type your ***Passphrase*** then press the **Return/Enter** key.

- Go to Step 7.

6 At the **<*user@remotehost*>'s password:** prompt type your ***Password*** then press the **Return/Enter** key.

7 Type **setenv ECS_HOME /usr/ecs/** then press the **Return/Enter** key.

- When logging in as a system user (e.g,, cmshared), the ECS_HOME variable may be set automatically so it may not be necessary to perform this step.

8 Type **cd /usr/ecs/*MODE*/CUSTOM/utilities** then press **Return/Enter**.

- Change directory to the directory containing the QA Monitor start script (e.g., EcDpPrQaMonitorGUIStart).
- The ***MODE*** will most likely be one of the following operating modes:
  - OPS (for normal operation).
  - TS1 (for SSI&T).
  - TS2 (new version checkout).
- Note that the separate subdirectories under /usr/ecs apply to (describe) different operating modes.

9 Type **EcDpPrQaMonitorGUIStart *MODE ApplicationID*** then press **Return/Enter** to launch the **QA Monitor** GUI.

- The **QA Monitor** GUI (Figure 60) is displayed.

Figure 60. Q/A Monitor GUI - QRU Data Tab

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Performing Science Product Quality Assurance

Science Product Quality Assurance

Science product quality assurance (QA) involves the use of the Q/A Monitor application. Science Computing Facility (SCF) personnel have the responsibility for performing QA of their products. The Production Monitor's role in QA is limited to updating the QA metadata. The procedure for updating QA metadata is performed in response to a request from SCF personnel to set the metadata flags on specified granule(s).

The procedure for updating QA metadata starts with the assumption that all applicable servers are currently running and the **Q/A Monitor** GUI **QRU data** tab (Figure 60) (QRU = Query, Retrieve and Update) is being displayed.

Updating Quality Assurance (QA) Metadata

1 In the **Data Types** field, click on the data type to be checked.

- It may be necessary to scroll through the **Data Types** list.
- The selected data type is highlighted.
- Only one data type can be selected at a time.
- Alternatively, the **Find** field and button can be used for specifying a data type.
  - The **Find** field is case-sensitive.

2 Click in the appropriate **Data Granule Insert** window field(s) and either type or use the up/down arrow buttons to enter the **Begin** date and **End** date in ***MM/DD/YYYY*** format.

- In the **Data Granule Insert** window it is necessary to specify the range of dates (between the **Begin** date and the **End** date) to formulate a query for searching for the desired granule(s) to be checked.
- Time is based upon day of insert into the data server. If no dates are entered, an error message is displayed.
- The up and down arrows next to the duration fields may be used for modifying entries in each field.
- The **Tab** key may be used to move from field to field.

3 Click on the **Query** button.

- Granules within the specified date range appear in the **Data Granules** field.

4 In the **Data Granules** field, click on the granule for which metadata is to be updated.

- It may be necessary to scroll through the list of granules.
- The selected granule is highlighted.
- Alternatively, the **Find** field and button may be used for specifying a data granule.
  - The **Find** field is case-sensitive.

5 Click on the **Update Metadata** button.

- The **Granule Parameters** window (Figure 61) is displayed.
- The **Granule Parameters** window displays one line for each parameter for the selected granule.

6 In the **Granule Parameters** window click on a parameter for which the metadata is to be updated.

- The selected parameter is highlighted.

7 Click on the **OK** button.

- The **Update Meta Data** window (Figure 62) is displayed.

8 Click and hold on the **Operational QA Flag** option button, move the mouse cursor to the desired selection (highlighting it), then release the mouse button.

- The selected metadata flag is displayed on the **Operator QA Flag** option button.
- The following options are available:
  - **Passed.**
  - **Failed.**
  - **Being Investigated.**
  - **Not Being Investigated.**

9 Type an explanation of the QA flag selection in the **Explanation** field.

10 If the SCF has specified that the SCF Quality Flag should be set to a particular value, click and hold on the **SCF Quality Flag** option button, move the mouse cursor to the SCF-specified selection (highlighting it), then release the mouse button.

- The selected metadata flag is displayed on the **SCF Quality Flag** option button.
- The same options are available as those on the **Operational Quality Flag** option button.

11 Type an explanation of the QA flag selection in the **Explanation** field.

NOTE: The **Auto Quality Flag** option button should not be accessible.

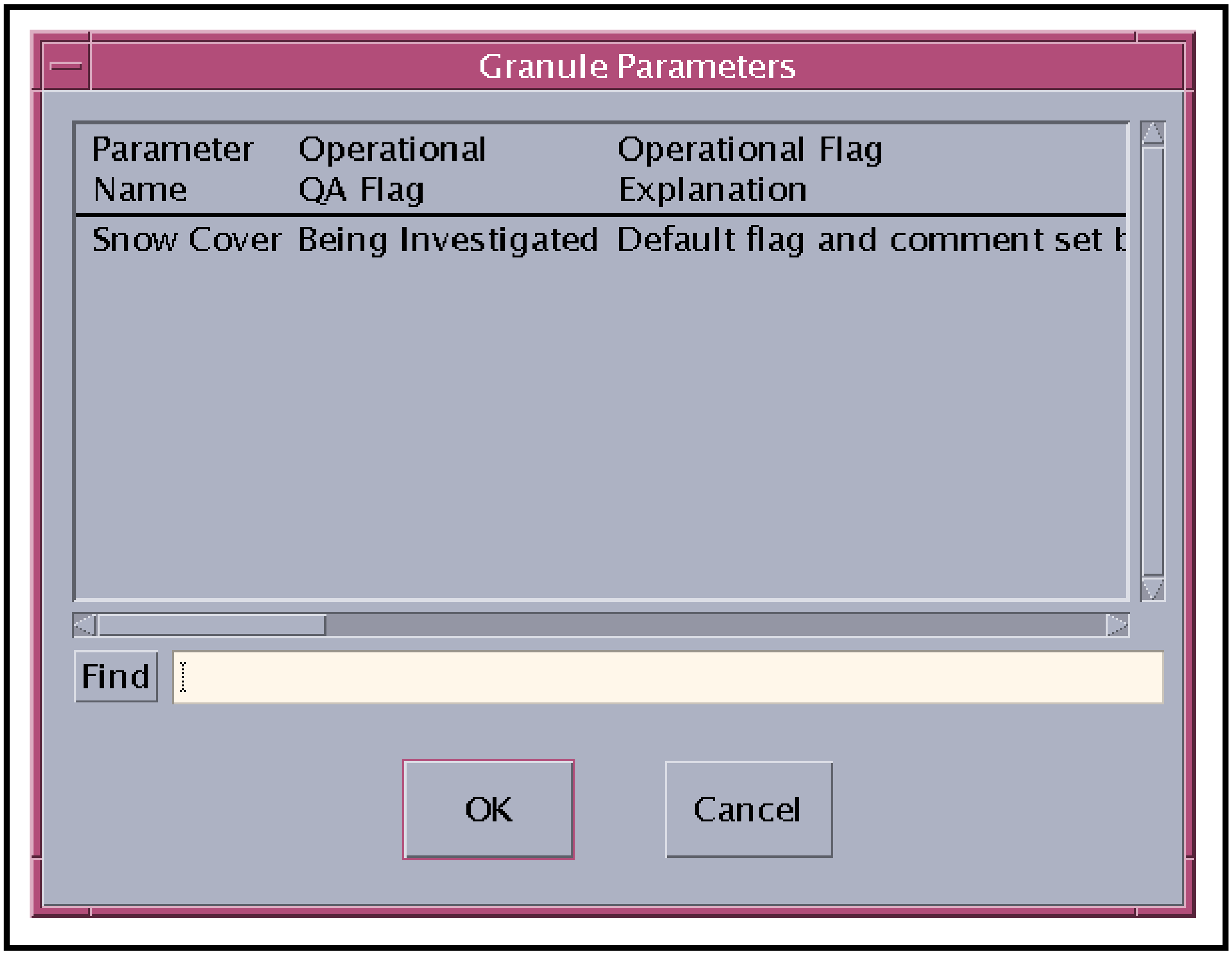

Figure 61. QA Monitor Granule Parameters Window

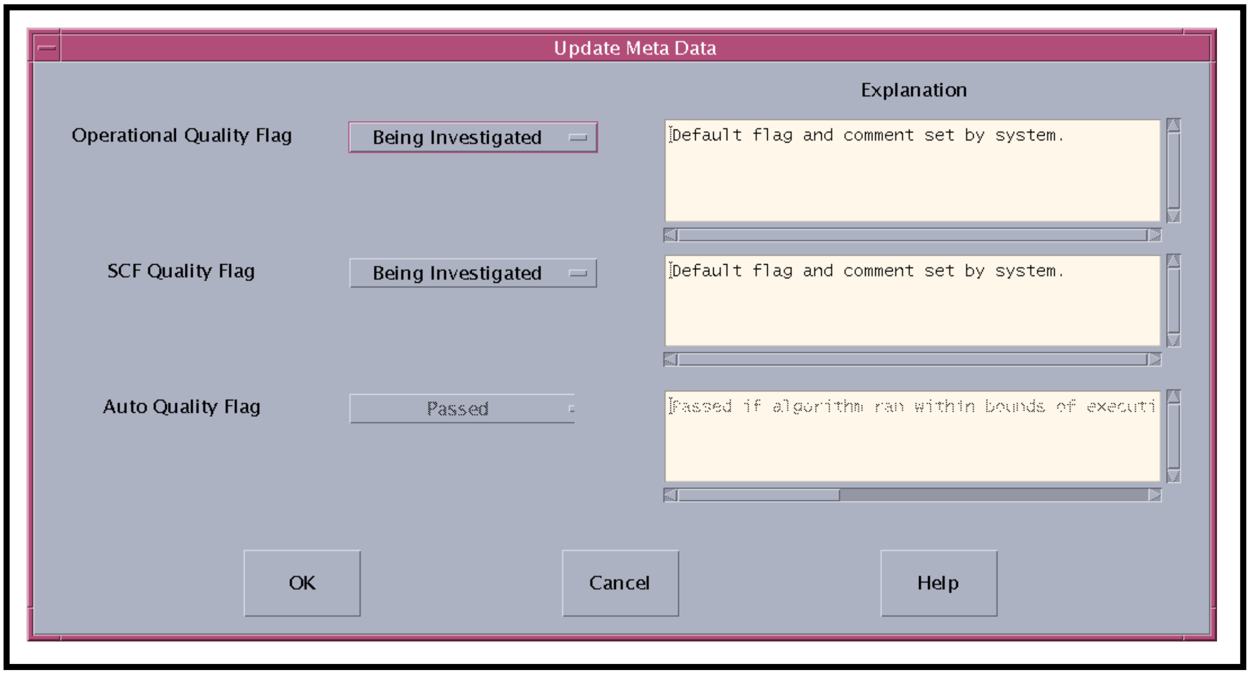

Figure 62. QA Monitor Update Meta Data Window

12 When the QA flags have been set with the desired values, click on the **OK** button.

- The settings are accepted and the **Update Meta Data** window is dismissed.
- To cancel the settings and dismiss the **Update Meta Data** window click on the **Cancel** button.
- The **Granule Parameters** window (Figure 61) is displayed.

13 Observe the entries in the **Granule Parameters** window to verify that the QA flag settings have actually been applied to the granule.

- The QA flag values and explanations entered using the **Update Meta Data** window are displayed.
- Repeat Steps 6 through 12 as necessary to revise the QA metadata for the granule parameter.

14 Repeat Steps 6 through 13 to update the QA metadata for any additional granule parameters.

15 When the QA flags for all relevant parameters have been set with the desired values and verified, click on the **OK** button in the **Granule Parameters** window.

- The **Granule Parameters** window is dismissed.
- The directory for visualizing data retrieved from the archive is as follows: /usr/ecs/*MODE*/CUSTOM/data/DPS

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Regenerating Granules

Regenerating Granules in Response to Loss of Files from the Archive

The reason for regenerating granules is to produce replacements for previously generated granules that have been lost or corrupted due to failure in the ECS archive. The overall process involves the following general operations:

- Retrieval of the Production History files (PH) for lost granules to determine parameters for the generation of replacement granules.
- Creating Production Requests for the generation of replacement granules.
- Creating and activating a Production Plan that includes the Production Requests for the generation of replacement granules.
- Preparing (if applicable) a "PDPS Residual Granules List," which identifies granules that either cannot or should not be regenerated at the DAAC.
  - Some granules do need not be reproduced; e.g., if there is a more recent version of the product available.

The regeneration process is initiated when the Production Planner receives a list of "Granules for PDPS Re-Generation." The list contains information about the granules to be regenerated and Universal References (URs) for the associated Production History tar files. The list is the product of a Science Data Server (SDSRV) procedure concerning SDSRV Retrieval of Granule Production History Metadata.

The following considerations apply to the regeneration of granules in response to the loss of files from the archive:

- When regenerating lost granules, all outputs of the PGE [not just those equivalent to the lost granule(s)] are to be produced and archived.
- There is no guarantee that when a PGE is re-run it will use the same inputs as were used during the original execution of the PGE; consequently, the output may be different from the original granule(s).
  - The variability of: Optional/Alternate inputs, Ad Hoc Reprocessing, Metadata Checks, Metadata Query and other production rules affects PGE output.

- It is possible that at the time of the original run of the PGE, certain optional/alternate inputs were not available, which became available later. During the re-run of the PGE use of those additional or other optional inputs cannot be avoided. However, it can be assumed that an equivalent or better product than the original will be produced as a result.

- PDPS maintains a minimal amount of granule-level versioning. By design, only the latest version of the granule is used.
  - If the PGE to be re-run uses inputs that have more than one granule-level version, PDPS uses only the latest version of those inputs.
  - However, if references to those granules have been deleted from the PDPS database (a delete script, which runs periodically, cleans up unused database entries), PDPS chooses the first one returned from SDSRV. SDSRV does not guarantee any sort of ordering in this case but PDPS selects the latest granule from those returned.
- At Production Request time, the default values for metadata checks can be overridden. The new values used are stored in the PDPS database but not in the Production History. If at the time a PGE is re-run the references to the PGE have been deleted from PDPS database, the default metadata checks are used.
  - It is possible that default metadata check values would cause the DPR not to be run; e.g., if the metadata checks are more restrictive than those used in the original run.
  - If changes to metadata checks were required in order to get DPRs to run originally, it is assumed that the values were saved as part of the PGE profile.
- For reasons of production timing or updated QA values, during regeneration a PGE subject to a metadata query could have input which is different from that used in the original processing.
  - The assumption is that regeneration will result in a better product.
- Other production rules (e.g., tiling) could make it impossible to reproduce identical granules.
- If a PGE (PGE name, version and profile) has to support lost granule regeneration, the PGE should not be deleted from the PDPS database.
  - In the SSIT **Operational Metadata** GUI, the delete flag for the PGE should not be checked.

The procedure for regenerating granules in response to loss of files from the archive starts with the assumption that all applicable production planning servers and data server servers are running.

Regenerating Granules in Response to Loss of Files from the Archive

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1 Determine which granules in the **Granules for PDPS Re-Generation** list should be regenerated (and which granules do not need to be reproduced).

2 Add granules that either cannot or do not need to be reproduced to the **PDPS Residual Granules** list.

3 Retrieve (using the **QA Monitor GUI**) the Production History tar file from the archive for each granule in the **Granules for PDPS Re-Generation** list that needs to be reproduced.

- Use the lost granule's datatype, and begin date and end date values that encompass its RangeBeginningDateTime and RangeEndingDateTime.
- **QA Monitor** interprets dates in UTC format.
- For each granule that meets the query conditions and is displayed on the **QA Monitor GUI**, the granule's UR, its Production History tar file's UR, and the name of the Production History tar file are shown. For only one of the granules will the URs (both the granule UR and the Production History UR) match the URs for this granule in the input list.
- The Production History tar file is acquired to a directory that is configurable.
  - The name of the configuration parameter is DpPrQA_DATA_DIR.
  - The default value for the parameter is $ECS_HOME/<MODE>/CUSTOM/data/DPS.
- If more than one granule in the input list maps to the same Production History tar file, the Production History tar file need not be retrieved multiple times.

4 Extract information needed to re-run the PGE from the Process Control File (PCF) in the PH.

- Information to be extracted from the PCF:
  - PGE Name.
  - PGE Version.
  - PGE Profile ID.
  - DPR Start time.
  - DPR Stop time.
  - PGE runtime parameters and their associated values.

- Identification of information in the PCF:
  - The PGE Name, PGE Version, and the PGE Profile appear in the System Runtime Parameters section of the PCF. They are concatenated (with a # sign to separate them) and appear in the place reserved for “Software ID”.
  - DPR Start time appears in the User Defined Parameter Section of the PCF under the logical ID 10258.
  - DPR Stop time also appears in the User Defined Parameter Section of the PCF under logical ID 10259.
  - All other logical IDs in the User Defined Parameter Section of the PCF form the run time parameters and their associated values. Note the logical ID and its corresponding values.

5 If the Query failed or did not return any hit that matched, add the granule to the **PDPS Residual Granules** list.

6 If the PGE name (including version and profile) that is extracted from the PCF does not appear as an Existing/New PGE, add the granule to the **PDPS Residual Granules** list.

7 From the SSIT host, launch the **SSIT Manager** GUI and invoke the **PDPS Operational Metadata** GUI.

8 Invoke the **PDPS Operational Metadata** GUI.

9 If the PGE is not registered, register the PGE using the **PDPS Science Update Metadata Update** from the **SSIT Manager** GUI.

- The PGE must be registered before a PR can be entered.

10 If it is decided not to re-register the PGE, add the granule to the **PDPS Residual Granules** list.

11 Launch the **Production Request Editor** GUI.

12 Create a Production Request for the relevant PGE/version/profile ID.

- Use **Ad-Hoc Reprocessing** for the **Processing Type**.
- Use the DPR Start and Stop Time listed in the Production History for the **Begin** and **End** times.
- Compare the default PGE runtime parameters with the runtime parameters obtained from the Production History tar file.
  - Modify the runtime parameter values to match exactly what was used in the original run.

- If granules to be regenerated are produced by PGEs that are chained, the PRs must be entered in the proper order.
  - For instance, if granules A and B are to regenerated, and PGEs P1 & P2 produce them and if P1 & P2 are chained (P2 takes P1's outputs as its inputs), then the production request for P1 must be entered before entering one for P2.

13 Launch the **Planning Workbench**.

14 Create and activate a production plan that includes the newly created Production Request(s).

15 Send the **PDPS Residual Granules** list to the originator of the **Granules for PDPS Re-Generation** list.

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Practical Exercise

Introduction

This exercise is designed to give the students practice in production planning and processing activities.

Equipment and Materials

One ECS workstation per student.

Statement of the requirements for the exercise.

Release 5A Operations Tools Manual for the ECS Project, 609-CD-500-001, one copy per student.

Mission Operation Procedures for the ECS Project, 611-CD-500-001, one copy per student.

Launching the Production Request Editor

The exercise involves launching the Production Request Editor using UNIX commands. The exercise begins with a student acting in the role of Production Planner recognizing the need to launch the Production Request Editor. The student launches the Production Request Editor as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Log in to the Planning/Management Workstation.
3. Set the necessary environmental variables.
4. Start the Production Request Editor GUI in the appropriate mode.

Creating a New Production Request

The exercise involves the preparation of a new production request. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for creating a new production request. The student prepares a new production request that is consistent with the requirements.

Perform the following steps:

1. Access the Production Request Editor.
2. Prepare a new production request that is consistent with the written or stated requirements.
3. Save the new production request.

Editing/Modifying a Production Request

The exercise requires the editing of a production request. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for editing an existing production request. The student modifies the production request consistent with the requirements.

Perform the following steps:

1. Access the Production Request Editor.
2. Select the Production Request to be modified.
3. Make production request modifications consistent with the written or stated requirements.
4. Save the modified production request.

Deleting a Production Request

The exercise involves deleting a production request. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for deleting an existing production request. The student deletes the production request as specified in the requirements.

Perform the following steps:

1. Select the PR List tab on the Production Request Editor GUI.
2. Select the production request to be deleted from those listed.
3. Delete the production request.

Reviewing Data Processing Requests

The exercise involves reviewing data processing requests. The exercise begins with a student acting in the role of Production Planner being directed to review specific data processing requests to determine specified characteristics. The student reviews the data processing requests consistent with the requirements.

Perform the following steps:

1. Select the DPR List tab on the Production Request Editor GUI.
2. Select a Production Request from the list on the option button.
3. Select a DPR from the list displayed.
4. Open the DPR.
5. Respond without error to questions concerning the characteristics of the DPR.

Deleting a Data Processing Request

The exercise involves deleting a data processing request. The exercise begins with a student acting in the role of Production Planner being directed to delete a specific data processing request. The student deletes the data processing request as specified in the requirements

Perform the following steps:

1. Select the DPR List tab on the Production Request Editor GUI.
2. Select the appropriate Production Request from the list on the option button.
3. Select the DPR to be deleted from the list displayed.
4. Delete the DPR.

Submitting and Withdrawing Subscriptions

The exercise involves submitting and withdrawing subscriptions using the Subscription Editor. The exercise begins with a student acting in the role of Production Planner being directed to submit and withdraw subscriptions using the Subscription Editor. The student submits and withdraws subscriptions as specified in the requirements.

Perform the following steps:

1. Log in to the Planning/Management Workstation.
2. Launch the Subscription Editor.
3. Respond to prompts to submit or withdraw the specified subscription.
4. Repeat Steps 2 and 3 as necessary to meet the specified requirements.

Launching Planning Workbench-Related GUIs

The exercise involves launching planning workbench-related GUIs using UNIX commands. The exercise begins with a student acting in the role of Production Planner recognizing the need to launch planning workbench-related GUIs. The student launches planning workbench-related GUIs as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Log in to the Planning/Management Workstation.
3. Set the necessary environmental variables.
4. Start the Planning Workbench GUI in the appropriate mode.
5. Start the Production Strategies GUI in the appropriate mode.

Defining a Production Strategy

The exercise involves the preparation of a production strategy. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for creating a production strategy. The student prepares a production strategy that is consistent with the requirements.

Perform the following steps:

1. Select priorities for the values for PR Type, User Type, and PGE Type.
2. Type weights for the preceding three DPR attributes (as needed).
3. Type a weight in the User Selected field.
4. Click on the Normalize button.
5. Type delta priority for Inter-DAAC Delta (if needed).
6. Type delta priority for Late Start Delta (if needed).
7. Save the Production Strategy.

Creating a New Production Plan

The exercise involves the preparation of a new production plan. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for creating a new production plan. The student prepares a new production plan that is consistent with the requirements.

Perform the following steps:

1. Access the Planning Workbench.
2. Prepare a new production plan that is consistent with the written or stated requirements.
3. Save the new production plan.
4. Activate the plan (if specified in the requirements).

Reviewing a Plan Timeline

The exercise involves reviewing a production plan timeline. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for reviewing a production plan timeline. The student reviews the specified production plan timeline and responds to questions concerning timeline characteristics.

Perform the following steps:

1. Access the specified production planning timeline.
2. Review the specified production planning timeline.
3. Respond without error to questions concerning the production planning timeline.

Troubleshooting Production Planning Problems

The exercise involves troubleshooting production planning problems. The exercise begins with a student acting in the role of Production Planner receiving the necessary trouble symptom information and requirements for troubleshooting the problem(s). The student reviews the specified trouble symptoms, takes action to correct the problem(s), and responds to questions concerning the possible cause(s).

Perform the following steps:

1. Review the trouble symptoms.
2. Check the status of relevant hosts/servers as necessary.
3. Check log files as necessary.
4. Take action to correct the problem(s).
5. Respond without error to questions concerning the possible cause(s).

Launching the AutoSys GUI Control Panel

The exercise involves launching the AutoSys GUI Control Panel using UNIX commands. The exercise begins with a student acting in the role of Production Monitor recognizing the need to launch the AutoSys GUI Control Panel. The student launches the AutoSys GUI Control Panel as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Log-in to the Data Processing Subsystem host.
3. Set the necessary environmental variables.
4. Source the appropriate file.
5. Start the GUI for the appropriate instance of AutoSys.

Configuring AutoSys Runtime Options

The exercise involves the configuration of AutoSys runtime options. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for configuring AutoSys runtime options. The student configures AutoSys consistent with the requirements.

Perform the following steps:

1. Launch the AutoSys GUI Control Panel.
2. Access the AutoSys functions specified in the written or stated requirements.
3. Select the AutoSys runtime options specified in the written or stated requirements.
4. Apply the AutoSys runtime options specified in the written or stated requirements.

Reviewing Hardware Status (Including Changing Hardware Status Views)

The exercise involves reviewing hardware status (including changing hardware status views) using AutoSys. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for reviewing hardware status using AutoSys. The student reviews hardware status using AutoSys as specified in the requirements.

Perform the following steps:

1. Access HostScape.
2. Review hardware status as specified in the written or stated requirements.
3. Change hardware status views as specified in the written or stated requirements.
4. Exit from HostScape.

Reviewing DPR Dependencies

The exercise involves reviewing DPR dependencies. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for reviewing DPR dependencies. The student reviews DPR dependencies as specified in the requirements.

Perform the following steps:

1. Access JobScape.
2. Review DPR dependencies as specified in the written or stated requirements.
3. Exit from JobScape.

Reviewing the DPR Production Timeline

The exercise involves reviewing the DPR production timeline. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for reviewing the DPR production timeline. The student reviews the DPR production timeline as specified in the requirements.

Perform the following steps:

1. Access TimeScape.
2. Review the DPR production timeline as specified in the written or stated requirements.
3. Exit from TimeScape.

Reviewing Alarms (Including Selecting Alarms to Be Displayed)

The exercise involves reviewing AutoSys alarms and selecting alarms to be displayed. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for selecting and reviewing AutoSys alarms. The student reviews and selects AutoSys alarms as specified in the requirements.

Perform the following steps:

1. Access the Alarm Manager through the Ops Console.
2. Re view alarms and select alarm to be displayed as specified in the written or stated requirements.
3. Exit from the AutoSys Alarm Manager.

Specifying Job Selection Criteria and Reviewing Job Activities

The exercise involves specifying job selection criteria and reviewing job activities using AutoSys. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for specifying job selection criteria and reviewing job activities using AutoSys. The student specifies job selection criteria and reviews job activities using AutoSys as specified in the requirements.

Perform the following steps:

1. Access the AutoSys Job Activity Console.
2. Specify job selection criteria as specified in the written or stated requirements.
3. Review job activities as specified in the written or stated requirements.
4. Exit from the AutoSys Job Activity Console.

Determining the Ownership of an AutoSys Job

The exercise involves determining the ownership of an AutoSys job using the AutoSys Job Definition GUI. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for determining the ownership of an AutoSys job. The student determines the ownership of an AutoSys job as specified in the requirements.

Perform the following steps:

1. Access the Descendants pop-up menu from the relevant job on either the AutoSys JobScape or TimeScape GUI.
2. Access the AutoSys Job Definition GUI from the Descendants pop-up menu.
3. Review the entry in the Owner field of the Job Definition GUI.
4. Exit from the Job Definition GUI.

Modifying Job Status (Including Sending an Event to a Job) Using AutoSys

The exercise involves modifying job status using AutoSys. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for modifying job status using AutoSys. The student modifies job status using AutoSys as specified in the requirements.

Perform the following steps:

1. Access the AutoSys Job Activity Console (Ops Console).
2. Specify job selection criteria for the AutoSys Job Activity Console.
3. Select the job with the status to be modified.
4. Click on the button corresponding to the desired action to be taken with respect to the selected job (if there is a corresponding button in the Actions region of the Job Activity Console).
5. If there is no button corresponding to the desired action, access the S end Event GUI by clicking on the Send Event button in the Actions Region of the Job Activity Console.
6. Make appropriate entries/selections on the Send Event GUI.
7. Send the event to the job from the Send Event GUI.

Reviewing Activity Logs and Job Dependency Logs

The exercise involves reviewing activity logs and job dependency logs. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for reviewing activity logs and job dependency logs. The student reviews an activity log and a job dependency log as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Type the appropriate command for an activity log as specified in the requirements.
3. Review the activity log.
4. Type the appropriate command for a job dependency log as specified in the requirements.
5. Review the job dependency log.

Defining and Running Monitors/Browsers

The exercise involves defining and running monitors/browsers. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for defining and running monitors/browsers. The student defines and runs monitors/browsers as specified in the requirements.

Perform the following steps:

1. Access the Monitor/Browser GUI.
2. Define monitors/browsers as specified in the requirements.
3. Save the monitors/browsers.
4. Run the monitors/browsers.

Reviewing the Database Maintenance Time

The exercise involves reviewing the database maintenance time. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for reviewing the database maintenance time. The student reviews the database maintenance time as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Access the AutoSys configuration file.
3. Review the database maintenance time.

Modifying the Maximum Number of Jobs in AutoSys

The exercise involves modifying the maximum number of jobs in AutoSys. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/ requirements for modifying the maximum number of jobs in AutoSys. The student modifies the maximum number of jobs in AutoSys as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Access the Job Management configuration file.
3. Edit the DpPrAutosysMaxJobs parameter.
4. Save the file.

Troubleshooting Processing Problems

The exercise involves troubleshooting production processing problems. The exercise begins with a student acting in the role of Production Monitor receiving the necessary trouble symptom information and requirements for troubleshooting the problem(s). The student reviews the specified trouble symptoms, takes action to correct the problem(s), and responds to questions concerning the possible cause(s).

Perform the following steps:

1. Review the trouble symptoms.
2. Check the status of relevant hosts/servers as necessary.
3. Check log files as necessary.
4. Take action to correct the problem(s).
5. Respond without error to questions concerning the possible cause(s).

Launching the QA Monitor GUI

The exercise involves launching the QA Monitor GUI using UNIX commands. The exercise begins with a student acting in the role of Production Monitor recognizing the need to launch the QA Monitor. The student launches the QA Monitor as specified in the requirements.

Perform the following steps:

1. Access the command shell.
2. Log in to the Planning/Management Workstation.
3. Set the necessary environmental variables.
4. Start the QA Monitor GUI in the appropriate mode.

Updating Quality Assurance (QA) Metadata

The exercise involves updating the QA metadata of a science product granule at the request of Science Computing Facility (SCF) personnel. The exercise begins with a student acting in the role of Production Monitor receiving the necessary information/requirements for performing a science product QA metadata update. The student performs science product QA metadata update as specified in the requirements.

Perform the following steps:

1. Set up and query the database using the QA Monitor GUI.
2. Select the granule with QA metadata to be updated.
3. Se t the operational and SCF quality flags to the appropriate value (as specified in the requirements).
4. Verify that the flags have actually been set in the database.

Regenerating Granules in Response to Loss of Files from the Archive

The exercise involves regenerating granules in response to a loss of files from the archive. The exercise begins with a student acting in the role of Production Planner receiving the necessary information/requirements for regenerating granules. The student determines which granules to regenerate, creates the necessary Production Request(s), and creates and activates a Production Plan as specified in the requirements.

Perform the following steps:

1. Retrieve the Production History files (PH) for lost granules.
2. Create Production Requests for the generation of replacement granules.
3. Create and activate a Production Plan that includes the Production Requests for the generation of replacement granules.
4. Prepare (if applicable) a “PDPS Residual Granules List.”

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Slide Presentation

Slide Presentation Description

The following slide presentation represents the slides used by the instructor during the conduct of this lesson.

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